Reference Manual
00809-0100-4075, Rev CA
March 2014

Smart Wireless THUM™ Adapter

IEC

WirelessHART

EMERSON™
Process Management

Smart Wireless THUM Adapter

Smart Wireless THUM™ Adapter Hardware Revision	1
HART® Device Revision	1
Field Communicator Field Device Revision	Dev v2.5 DD v4

NOTICE

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure to thoroughly understand the contents before installing, using, or maintaining this product.

The United States has two toll-free assistance numbers and one international number.

Customer Central
1 800 999 9307 (7:00 a.m. to 7:00 p.m. CST)

National Response Center
1 800 654 7768 (24 hours a day)
Equipment service needs

International
1 952 906 8888

⚠ CAUTION

The products described in this document are NOT designed for nuclear-qualified applications.

Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact an Emerson Process Management Sales Representative.

⚠ WARNING

Explosions could result in death or serious injury:

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Product Certifications section for any restrictions associated with a safe installation.

- Before connecting a Field Communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.

Electrical shock can result in death or serious injury:

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions. This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

NOTICE

The THUM and all other wireless devices should be installed only after the Smart Wireless Gateway has been installed and is functioning properly. Wireless devices should also be powered up in order of proximity from the Smart Wireless Gateway, beginning with the closest. This will result in a simpler and faster network installation.

NOTICE

During normal operation, or in fault condition, the THUM will cause a 2.5 V drop in the connected loop. It is important to ensure that the power supply can provide at least 2.5 V more than the lift off voltage of the wired device to make sure it works properly with the THUM installed. To determine the lift off voltage for the wired device, review the wired device operation and installation manual.

Content

Section 1: Introduction

1.1 Safety messages 1
1.1.1 Warnings 1
1.2 Overview 2
1.2.1 Manual 2
1.2.2 Features 3
1.3 Considerations 3
1.3.1 General 3
1.3.2 Commissioning 3
1.3.3 Mechanical 3
1.3.4 Electrical 3
1.3.5 Environmental 3
1.3.6 Wireless considerations 4
1.4 Service support 6
1.5 Product recycling/disposal 6

Section 2: Configuration

2.1 Safety messages 7
2.1.1 Warnings 7
2.2 Connections 7
2.3 Device sensor configuration 8
2.4 Connection diagrams 8
2.5 Device network configuration 9
2.5.1 Join device to network 9
2.5.2 Configure update rate 9
2.5.3 Configure THUM long tag 10
2.5.4 Wired device tag 10
2.6 HART tree 11

Section 3: Mounting

3.1 Safety messages 13
3.1.1 Warnings 13
3.2 Mounting 14
3.2.1 Direct mount 14
3.2.2 Remote mount 15

3.2.3 Power supply 15
3.2.4 Load resistor 16
3.2.5 Wiring 17
3.3 Loop current test 27

Section 4: Commissioning

4.1 Safety messages 29
4.1.1 Warnings 29
4.2 Device network configuration 30
4.2.1 Network status 31
4.2.2 Verify operation 31

Section 5: Operation and maintenance

5.1 Safety messages 33
5.1.1 Warnings 33
5.2 Startup sequence 33
5.3 Advanced setup 34
5.3.1 Configure advanced update rate 34
5.3.2 4-20 mA current 34
5.3.3 Voltage drop 34
5.3.4 Discovery mode 34
5.3.5 Configure HART polling 35
5.3.6 Configure router only mode 35
5.3.7 HART address 35
5.3.8 HART master 35

Section 6: Troubleshooting

6.1 Overview 37
6.1.1 Warnings 37

Appendix A: Reference data

A.1 Functional specifications 39
A.2 Physical specifications 39
A.3 Performance specifications 40
A.4 Dimensional drawings 41
A.5 Ordering information 43
A.6 Accessories and spare parts 44

Appendix B: Product Certifications

B.1 Approved Manufacturing Locations 45
B.2 European Directive Information 45
B.3 Telecommunication Compliance 45
B.4 FCC and IC 46
B.5 Ordinary Location Certification for FM 46
B.6 Hazardous Locations Certificates 46

Section 1 Introduction

Safety messages . . . . . page 1
Overview . . . . . page 2
Considerations . . . . . page 3
Service support . . . . . page 6
Product recycling/disposal . . . . . page 6

1.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

1.1.1 Warnings

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Make sure only qualified personnel perform the installation.

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals.

1.2 Overview

1.2.1 Manual

This manual is designed to assist in the installation, operation, and maintenance of the Smart Wireless THUM Adapter.

Section 1: Introduction

- Manual and Transmitter Overview
- Considerations
- Return of Materials

Section 2: Configuration

- Device Sensor Configuration
- Device Network Configuration

Section 3: Mounting

- Mount the Sensor
- Sensor Assembly/Leads
- Grounding

Section 4: Commissioning

- Network Status
- Verify Operation

Section 5: Operation and maintenance

- Startup Sequence
- Advanced Setup

Appendix A: Reference data

- Specifications
- Dimensional Drawings
- Ordering Information

Appendix B: Product Certifications

- Product Certifications
- Installation Drawings

1.2.2 Features

- An installation-ready solution that provides rich wireless HART® data
- Works with any 2- or 4-wire HART devices
- Flexibility to meet your most demanding applications
- Wireless output with >99% data reliability delivers rich HART data, protected by industry leading security
- Gain access to additional HART information, such as diagnostics or multi-variable data
- Add wireless to almost any measurement point without affecting the approval of the sub-device
- IEC 62591 (WirelessHART®) capabilities extend the full benefits of PlantWeb™ to previously inaccessible locations

1.3 Considerations

1.3.1 General

The Smart Wireless THUM Adapter is connected to a HART sub-device. With simple HART configuration, the THUM transmits the HART information from the sub-device into the Wireless network.

1.3.2 Commissioning

The THUM can be commissioned before or after installation. It may be useful to bench commission the THUM before installation to ensure proper operation and to become familiar with the functionality. The instruments should be installed in accordance with intrinsically safe or non-incendive field wiring practices, when required. The THUM Adapter is powered when connected to a powered loop.

1.3.3 Mechanical

When choosing an installation location and position for the transmitter, take into account access to the device. For best performance, the antenna should be vertical and have some space between objects in a parallel metal plane such as a pipe or metal framework, as the pipes or framework may adversely affect the performance of the antenna.

1.3.4 Electrical

The THUM Adapter is connected into a powered 4–20 mA loop, powering itself by scavenging power. The THUM Adapter causes a voltage drop across the loop. The drop is linear from 2.25 volts at 3.5 mA to 1.2 volts at 25 mA, but does not effect the 4–20 mA signal on the loop. Under fault conditions, the maximum voltage drop is 2.5 volts.

1.3.5 Environmental

Verify that the operating environment of the transmitter is consistent with the appropriate hazardous locations certifications.

Temperature limits

Operating limit	Storage limit
–40 to 185 °F	–40 to 185 °F
–40 to 85 °C	–40 to 85 °C

1.3.6 Wireless considerations

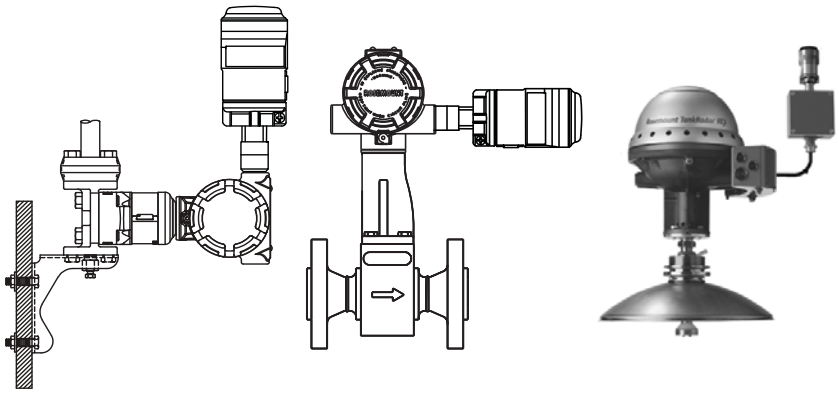
Power up sequence

Power should not be applied to any wireless device until the Smart Wireless Gateway ("Gateway") is installed and functioning properly. Wireless devices should also be powered up in order of proximity from the Gateway, beginning with the closest. This will result in a simpler and faster network installation. Enable Active Advertising on the Gateway to ensure that new devices join the network faster. For more information see the Smart Wireless Gateway Manual (Doc. No. 00809-0200-4420).

THUM adapter position

If possible, the THUM Adapter should be positioned vertically, either straight up or straight down, and it should be approximately 3 ft. (1 m) from any large structure, building, or conductive surface to allow for clear communication to other devices. If the THUM Adapter is mounted horizontally, wireless communication range may be decreased.

Figure 1-1. THUM adapter position



Conduit entry

When installing the THUM Adapter into the conduit entry of a wired device, use an approved thread sealant. Thread sealant provides a water tight seal. The thread sealant also provides a lubrication to ensure easy removal of the THUM Adapter.

M20 conduit adapter

When using the M20 Conduit Adapter on the THUM Adapter, use an approved thread sealant and tighten wrench tight to the THUM Adapter. When installing the M20 conduit adapter into a conduit tighten to 32.5 Nm/25 ft-lb. to ensure water tight seal.

Field Communicator connections

In order for the Field Communicator to interface with the THUM Adapter, the wired device must be powered. The Field Communicator must be put into poll mode and should use the THUM Adapter address of 63.

Power supply

Minimum loop load of 250 Ohms.
The THUM Adapter communicates and derives power from a standard 4-20 mA/HART loop. The THUM Adapter causes a small voltage drop on the loop which is linear from 2.25 V at 3.5 mA to 1.2 V at 25 mA. Under fault conditions, the maximum voltage drop is 2.5 V. The THUM Adapter will not affect the 4-20 mA signal under normal or fault conditions as long as the loop has at least a 2.5 V margin at the maximum loop current (25 mA for a typical 4-20 mA/HART device).

Limit the power supply to 0.5 Amps maximum, and voltage to 55 Vdc.

Loop current	THUM Adapter voltage drop
3.5 mA	2.25 V
25 mA	1.2 V

Load resistor

If required, add a load resistor as shown in Figure 3-20, Figure 3-22, and Figure 3-24. The resistor should be adequately rated for the application (1W minimum) and be compatible with the supplied splice connector which accepts wire sizes from 14 to 22 AWG.

When adding a load resistor, ensure that uninsulated conductors do not contact the enclosure and/or other exposed metal parts.

1.4 Service support

To expedite the return process outside of North America, contact your Emerson Process Management representative.

Within the United States, call the Emerson Process Management Response Center toll-free number 1 800 654 7768. The center, which is available 24 hours a day, will assist you with any needed information or materials.

The center will ask for product model and serial numbers, and will provide a Return Material Authorization (RMA) number. The center will also ask for the process material to which the product was last exposed.

⚠ CAUTION

Individuals who handle products exposed to a hazardous substance can avoid injury if they are informed of, and understand, the hazard. If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDS) for each hazardous substance identified must be included with the returned goods.

1.5 Product recycling/disposal

Recycling of equipment and packaging should be taken into consideration and disposed of in accordance with local and national legislation/regulations.

Section 2 Configuration

Safety messages . . . . . page 7
Connections . . . . . page 7
Device sensor configuration . . . . . page 8
Connection diagrams . . . . . page 8
Device network configuration . . . . . page 9
HART tree . . . . . page 11

2.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

2.1.1 Warnings

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Only qualified personnel should perform the installation

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure that the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

2.2 Connections

Section 2 details wiring the THUM Adapter to the different types of compatible sub-devices.

2.3 Device sensor configuration

The THUM Adapter, attached to a powered sub-device, receives HART communication from a handheld Field Communicator or AMS™ Device Manager.

Field Communicator

In order to communicate with the THUM Adapter, polling must be activated on the Field Communicator. The default address for the THUM Adapter is 63. Also, note that any configuration changes must be sent to the transmitter using the Send key (F2).

AMS Wireless Configurator

AMS Wireless Configurator is capable of connecting devices directly using a HART modem or the Gateway. For configuring through AMS Wireless Configurator, double click the device icon and choose the Configure/Setup tab. AMS Wireless Configurator configuration changes are implemented when the Apply button is selected.

2.4 Connection diagrams

Bench hook-up

Connect the bench equipment as shown in either Figure 2-1 or Figure 2-2, and turn on the Field Communicator by pressing the ON/OFF key or log into AMS Device Manager. The or AMS Device Manager will search for a HART-compatible device and indicate when the connection is made. If the or AMS Device Manager fail to connect, it indicates that no device was found. If this occurs, refer to Section 4: Commissioning.

Field hook-up

Section 2: Configuration details the field hook-up requirements in Figure 2-1 and Figure 2-2.

Figure 2-1. THUM adapter only, powered by a current source

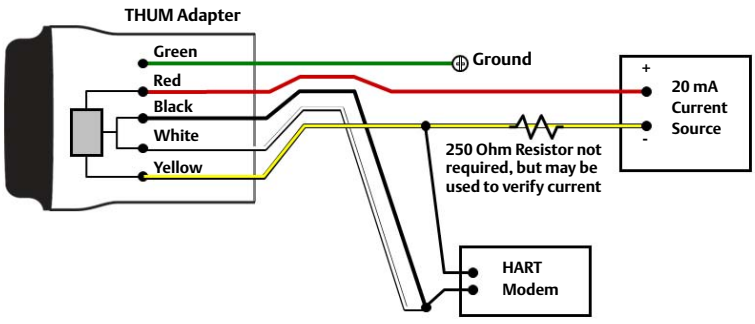
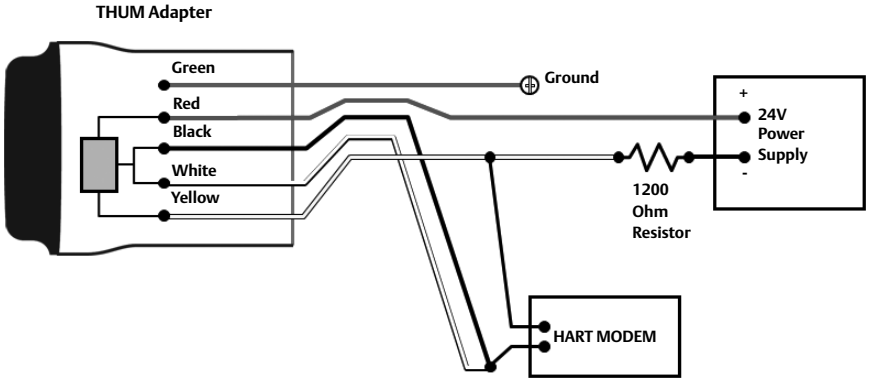


Figure 2-2. THUM adapter only, powered by a 24 V power supply with 1200 Ohm resistor to limit current to 20 mA



The 1200 Ohm resistor should be adequately rated for the application (3W minimum).

2.5 Device network configuration

2.5.1 Join device to network

Fast Keys	2, 1, 1

In order to communicate with the Smart Wireless Gateway, and ultimately the Host System, the THUM must be configured to communicate over the wireless network. This step is the wireless equivalent of connecting wires from a transmitter to the host system.

1. From the *Home* screen, select **2: Configure.**
2. Select **1: Guided Setup**.
3. Select **1: Join Device to Network**.

Using a or AMS Device Manager, enter the Network ID and Join Key so that they match the Network ID and Join Key of the Smart Wireless Gateway and other devices in the network. If the Network ID and Join Key are not identical to those set in the Gateway, the THUM will not communicate with the network. The Network ID and Join Key may be obtained from the Smart Wireless Gateway on the Setup>Network>Settings page on the web server.

2.5.2 Configure update rate

Fast Keys	2, 1, 2

The Update Rate is the frequency at which a new measurement is taken and transmitted over the wireless network. This by default is 1 minute. This may be changed at commissioning, or at any time via AMS Wireless Configurator. The Update Rate is user selectable from 8 seconds to 60 minutes.

1. From the Home screen, select **2: Configure**.
2. Select **1: Guided Setup**.
3. Select **2: Configure Update Rate**.

2.5.3 Configure THUM long tag

Fast Keys	2, 2, 4, 2

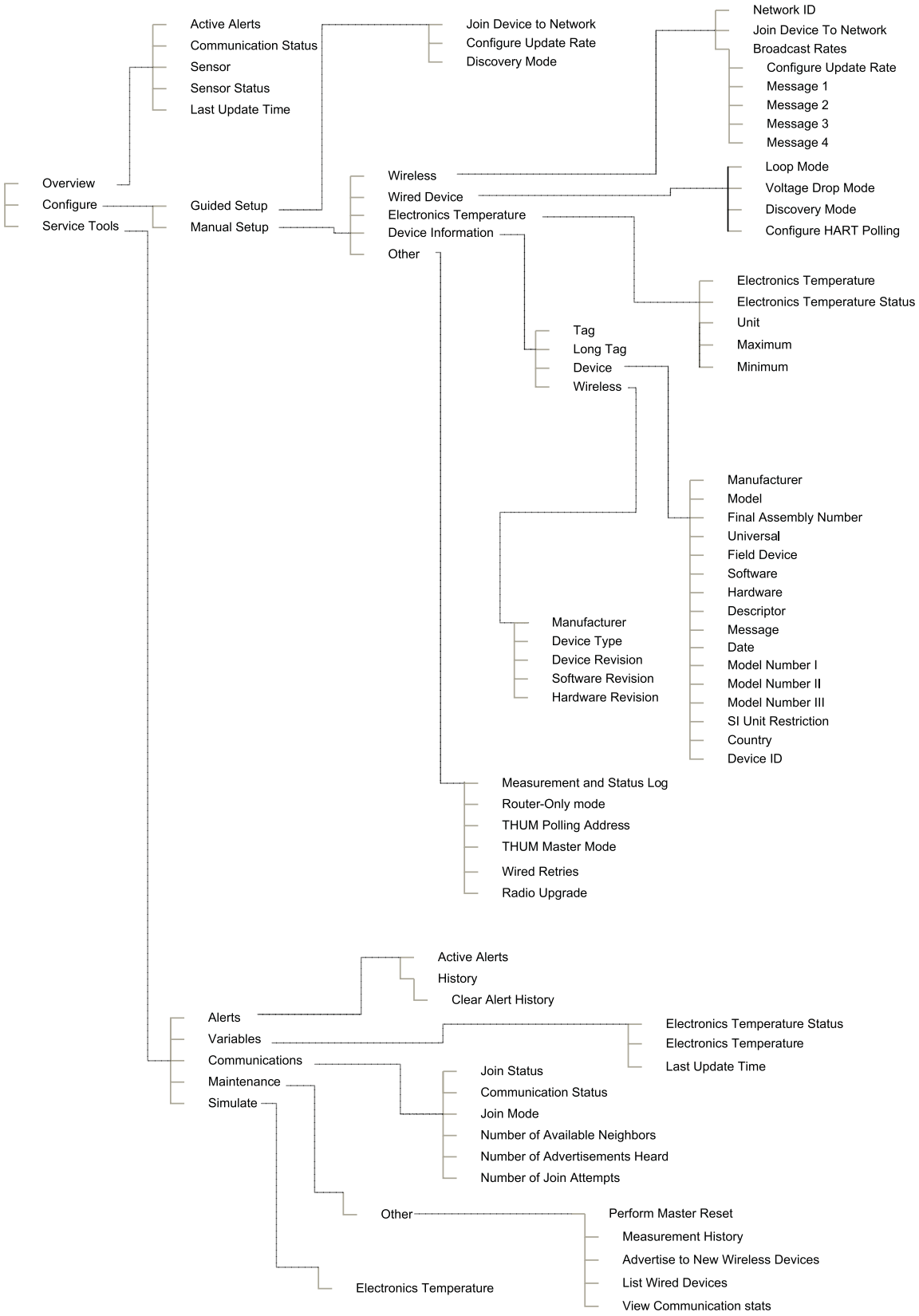
The Long Tag is how the THUM Adapter will show up in the Smart Wireless Gateway web interface. By setting this parameter to a unique value it will be easier to determine which THUM Adapter you are communicating with. One way to do this is to use the tag number of the wired device that the THUM adapter is connected to followed by THUM (HARTTAG-THUM).

1. From the Home screen, select **2: Configure.**
2. Select **1: Manual Setup**.
3. Select **2: Device Information tab**.
4. Enter the Long Tag.

2.5.4 Wired device tag

For HART 5 devices the THUM Adapter uses the message field when reporting the HART tag to the Smart Wireless Gateway. To ensure that you can identify the wired device in the Gateway make sure to write the tag information into the message field for all HART 5 devices. For HART 6 or newer devices the THUM reports the long tag as the HART tag to the Gateway.

2.6 HART tree


Overview
Configure
Service Tools
Active Alerts
Communication Status
Sensor
Sensor Status
Last Update Time
Guided Setup
Manual Setup
Join Device to Network
Configure Update Rate
Discovery Mode
Wireless
Wired Device
Electronics Temperature
Device Information
Other
Network ID
Join Device To Network
Broadcast Rates
Configure Update Rate
Message 1
Message 2
Message 3
Message 4
Loop Mode
Voltage Drop Mode
Discovery Mode
Configure HART Polling
Electronics Temperature
Electronics Temperature Status
Unit
Maximum
Minimum
Tag
Long Tag
Device
Wireless
Manufacturer
Model
Final Assembly Number
Universal
Field Device
Software
Hardware
Descriptor
Message
Date
Model Number I
Model Number II
Model Number III
SI Unit Restriction
Country
Device ID
Manufacturer
Device Type
Device Revision
Software Revision
Hardware Revision
Measurement and Status Log
Router-Only mode
THUM Polling Address
THUM Master Mode
Wired Retries
Radio Upgrade
Alerts
Variables
Communications
Maintenance
Simulate
Active Alerts
History
Clear Alert History
Electronics Temperature Status
Electronics Temperature
Last Update Time
Join Status
Communication Status
Join Mode
Number of Available Neighbors
Number of Advertisements Heard
Number of Join Attempts
Other
Perform Master Reset
Measurement History
Advertise to New Wireless Devices
List Wired Devices
View Communication stats
Electronics Temperature

Section 3 Mounting

Safety messages . . . . . page 13
Mounting . . . . . page 14
Loop current test . . . . . page 27

3.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

3.1.1 Warnings

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Only qualified personnel should perform the installation

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure that the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

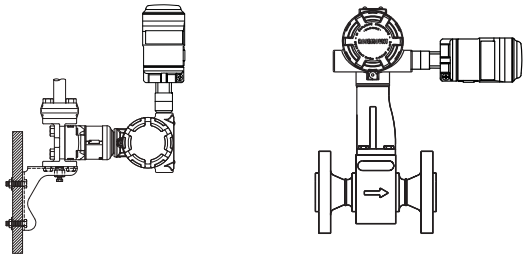
3.2 Mounting

The THUM can be installed in one of two configurations:

- Direct Mount
- Remote Mount

Direct Mount: The THUM Adapter is connected directly to the conduit entry of the wired device.

Figure 3-1. Direct Mount



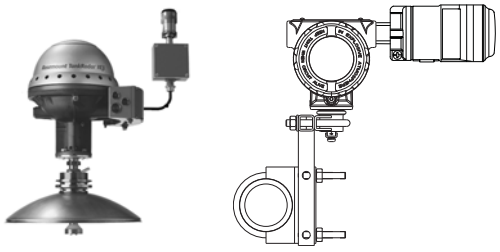
3.2.1 Direct mount

1. Install the HART device according to standard installation practices, being sure to use an approved thread sealant on all connections.
2. Attach the THUM Adapter to the wired device as shown in Figure 3-1. When installing the THUM Adapter into the conduit entry of a wired device, use an approved thread sealant.
3. Connect the THUM Adapter to the HART wired device using the wiring diagrams below. See Figure 3-19 through Figure 3-26 on the following pages.
4. Close the housing cover on the HART wired device, so that metal touches metal, but do not over tighten to prevent damaging the unit.

Note
Two splice connectors are included with the THUM Adapter. The first is a two connection splice. The second is a three connection splice for use with a resistor, if there is not enough resistance in the loop. Both of these splice connectors can accept 14 to 22 gauge wire. See wired device reference manual for information on the required loop resistance.

Remote Mount: The THUM Adapter is mounted separate from the wired device housing and then connected to the wired device using conduit.

Figure 3-2. Remote mount



3.2.2 Remote mount

1. Install the HART device according to standard installation practices, being sure to use an approved thread sealant on all connections.
2. The THUM Adapter should be mounted as shown in Figure 3-2 on page 15.
3. Connect the THUM Adapter to the wired device using standard practices. Wire running from the THUM Adapter to the wired device must be shielded or in conduit.
4. Ground the Remote Mount Kit per local practices.
5. Connect the THUM Adapter to the HART wired device using the wiring diagrams below. See Figure 3-19 through Figure 3-26 on the following pages.
6. Close the housing cover on the HART wired device, so that metal touches metal, but do not over tighten to prevent damaging the unit.

Note
Two splice connectors are included with the THUM Adapter. The first is a two connection splice. The second is a three connection splice for use with a resistor, if there is not enough resistance in the loop. Both of these splice connectors can accept 14 to 22 gauge wire. See wired device reference manual for information on the required loop resistance.

3.2.3 Power supply

Minimum loop load of 250 Ohms.

The THUM Adapter communicates and derives power from a standard 4-20 mA/HART loop. The THUM Adapter causes a small voltage drop on the loop which is linear from 2.25 V at 3.5 mA to 1.2 V at 25 mA. Under fault conditions, the maximum voltage drop is 2.5 V. The THUM Adapter will not affect the 4-20 mA signal under normal or fault conditions as long as the loop has at least a 2.5 V margin at the maximum loop current (25 mA for a typical 4-20 mA/HART device).

Limit the power supply to 0.5 Amps maximum, and voltage to 55 Vdc.

Loop Current	THUM Adapter voltage drop
3.5 mA	2.25 V
25 mA	1.2 V

3.2.4 Load resistor

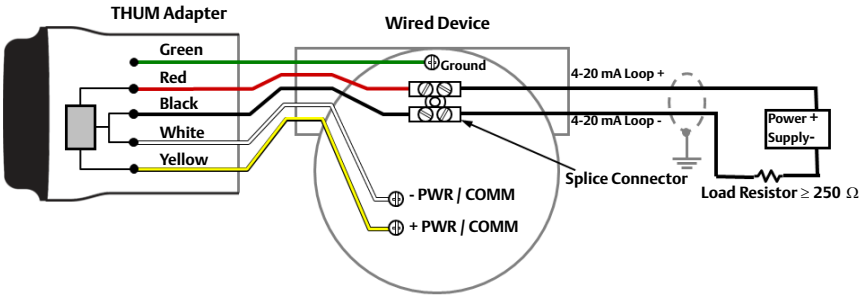
If required, add a load resistor as shown in Figure 3-20, Figure 3-22, and Figure 3-24. The resistor should be adequately rated for the application (1W minimum) and be compatible with the supplied splice connector which accepts wire sizes from 14 to 22 AWG.

3.2.5 Wiring

Note
In order for the THUM Adapter to function properly there must be at least 250 Ohms resistance in the loop. If the 4–20 mA loop does not have the required resistance, wire a resistor as shown in Figure 3-20, Figure 3-22, or Figure 3-24 as applicable.

When adding a load resistor ensure that uninsulated conductors do not contact the enclosure and/or other exposed metal parts.

Figure 3-3. Direct mount wiring diagram for 2-wire device



Note
In order for the THUM Adapter to function properly there must be at least 250 Ohms resistance in the loop. If the 4–20 mA loop does not have the required resistance, wire a resistor as shown in Figure 3-6, Figure 3-10, or Figure 3-13 as applicable.

Figure 3-4. Remote mount wiring diagram for 2-wire device

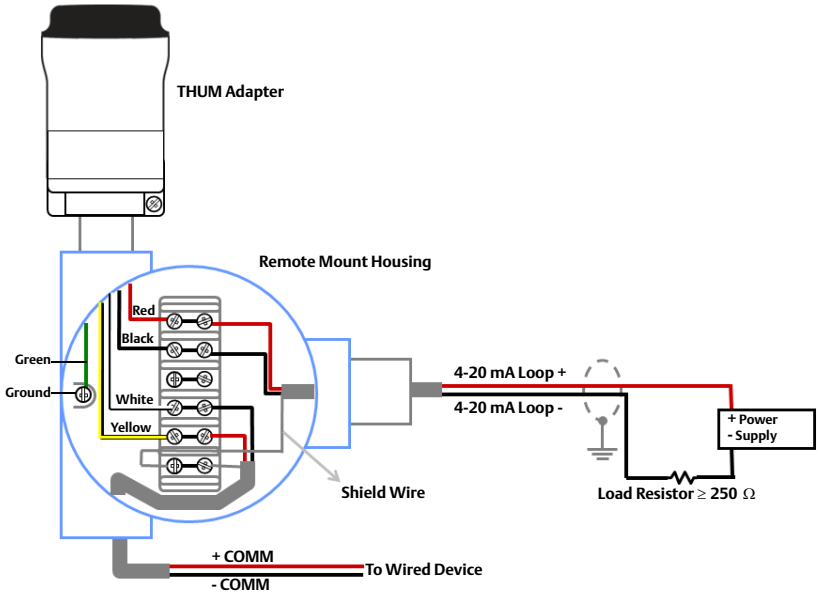


Figure 3-5. Direct mount wiring diagram for 2-wire device with resistor

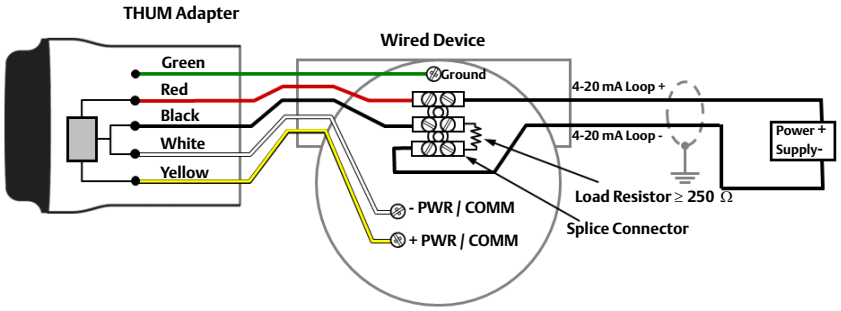


Figure 3-6. Remote mount wiring diagram for 2-wire device with resistor

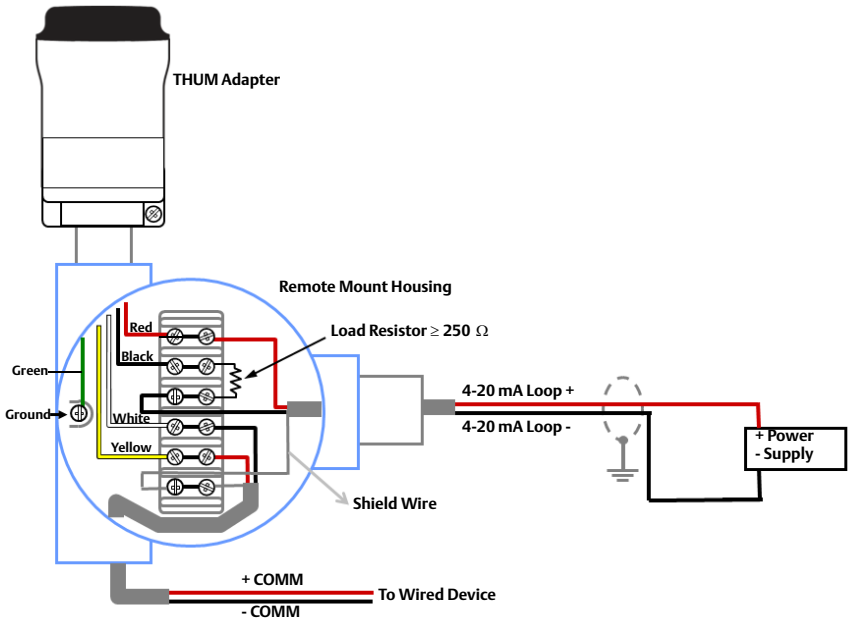
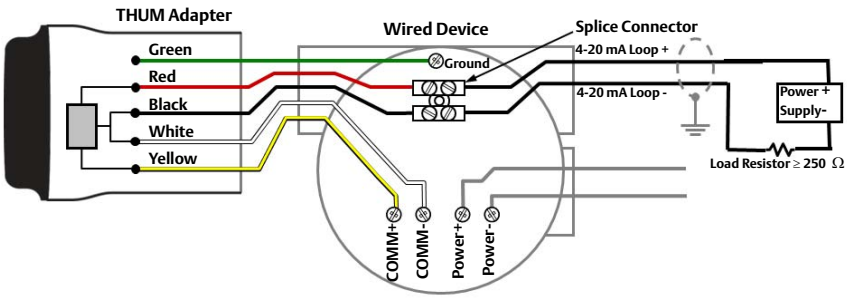


Figure 3-7. Direct mount wiring diagram for 4-wire passive device



Note
A passive loop exists when the wired device is not supplying power to the 4–20 mA loop. It is important to verify if the wired device is operating in active or passive mode.

Figure 3-8. Remote mount wiring diagram for 4-wire passive device

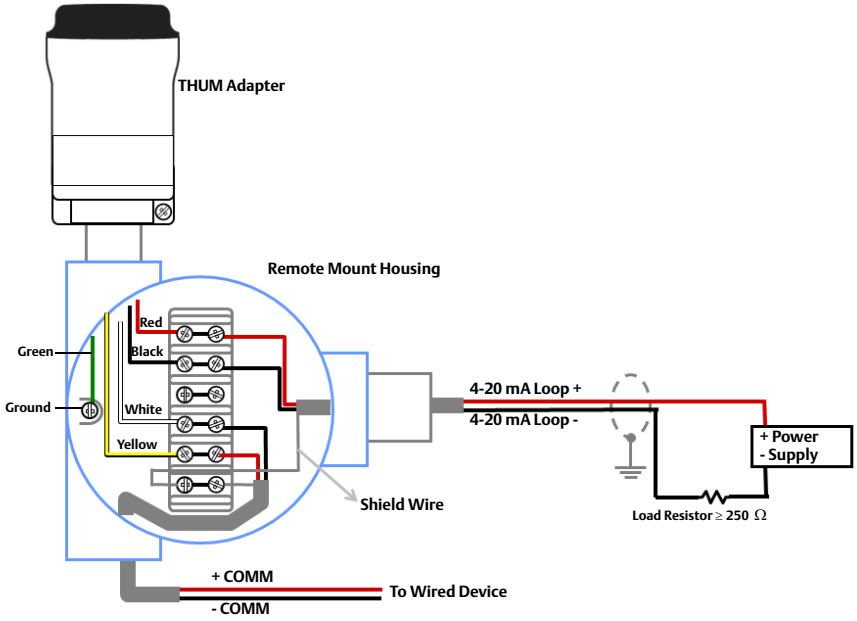


Figure 3-9. Direct mount wiring diagram for 4-wire passive device with resistor

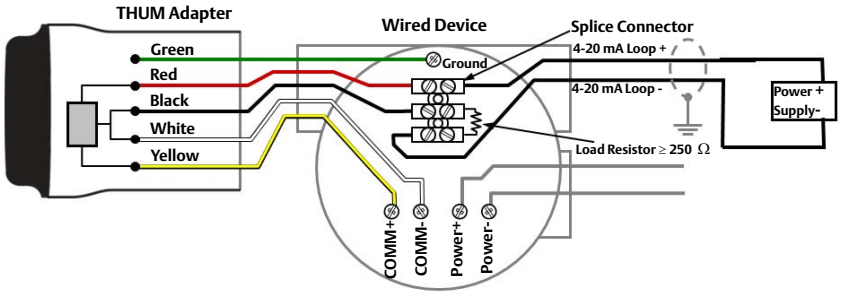


Figure 3-10. Remote mount wiring diagram for 4-wire passive device with resistor

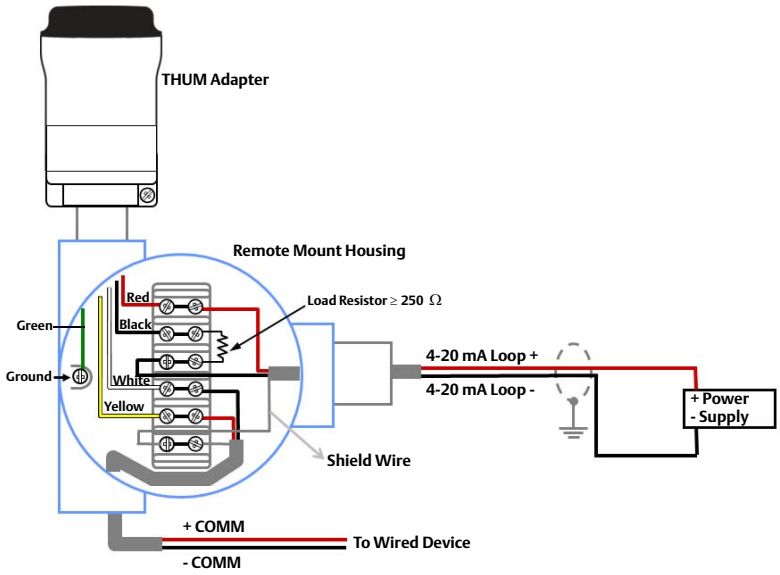
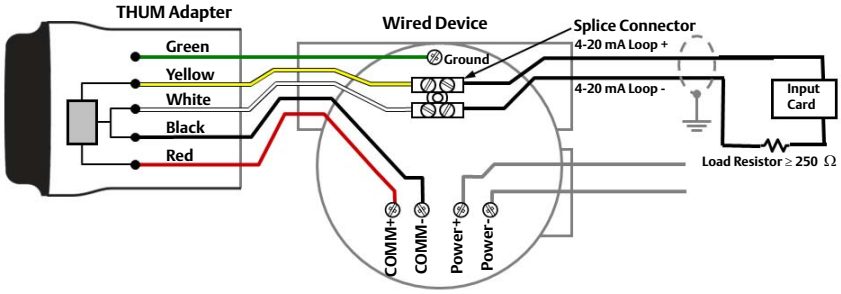


Figure 3-11. Direct mount wiring diagram for 4-wire active device



Note
An active loop exists when the wired device is supplying the power to the 4-20 mA loop. It is important to verify if the wired device is operating in active or passive mode.

Figure 3-12. Remote mount wiring diagram for 4-wire active device

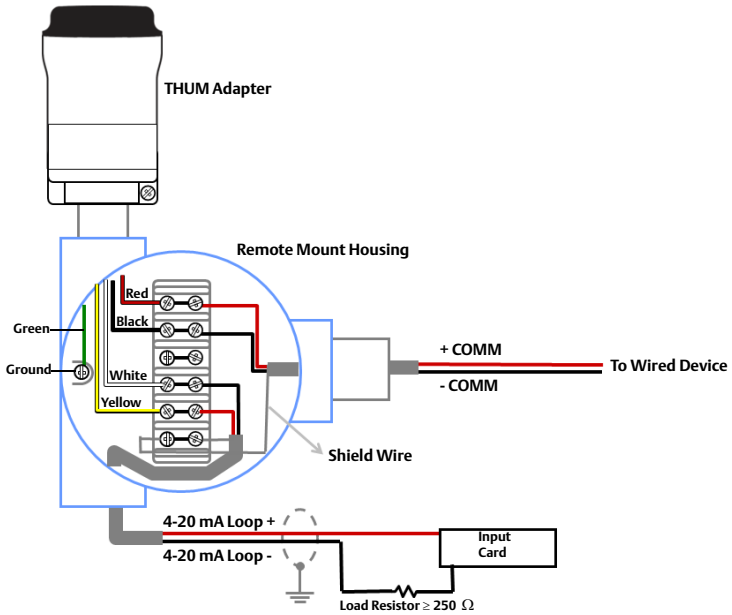


Figure 3-13. Direct mount wiring diagram for 4-wire active device with resistor

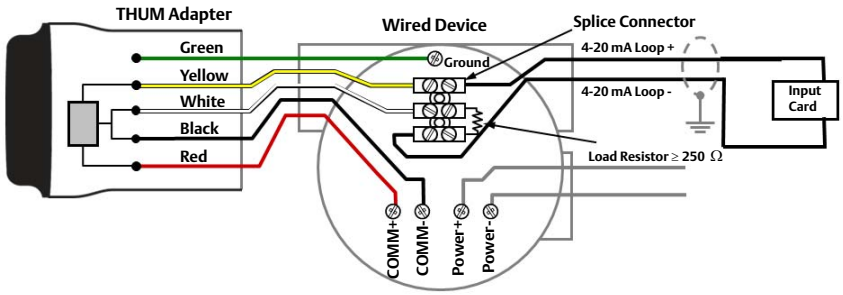


Figure 3-14. Remote mount wiring diagram for 4-wire active device with resistor

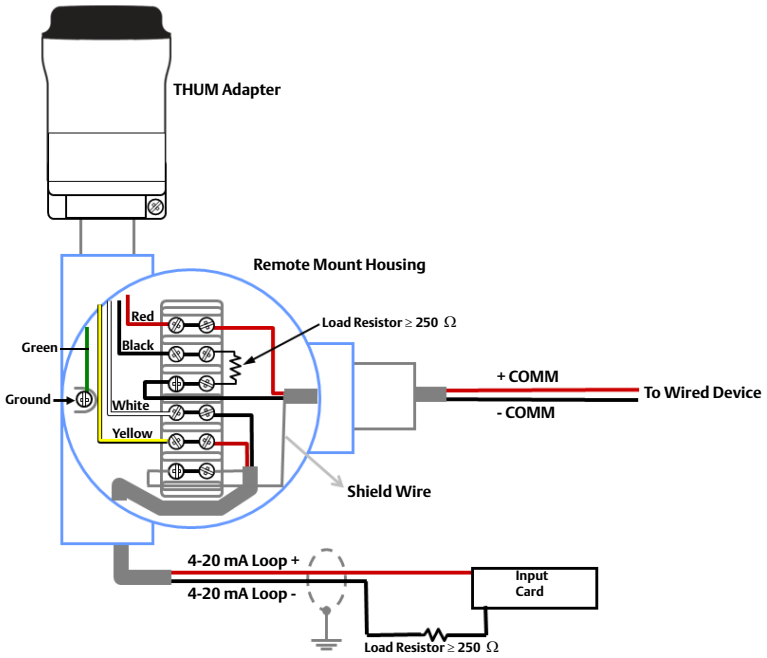


Figure 3-15. Direct mount wiring diagram for 4-wire active device with no 4-20 mA loop

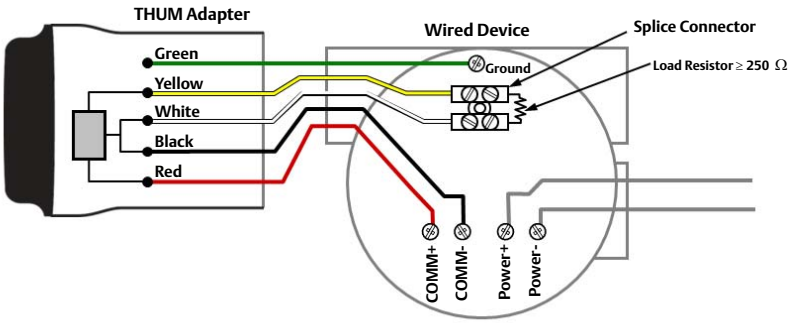


Figure 3-16. Remote mount wiring diagram for 4-wire active device with no 4-20 mA loop

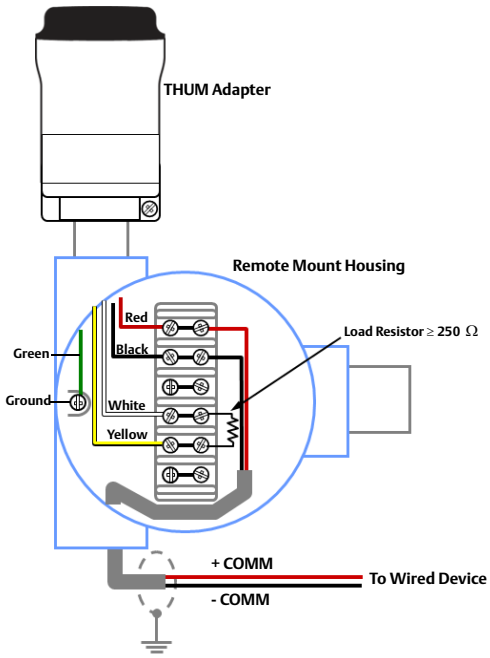


Figure 3-17. THUM adapter only, powered by a 24 V power supply with 1200 Ohm resistor to limit current to 20 mA

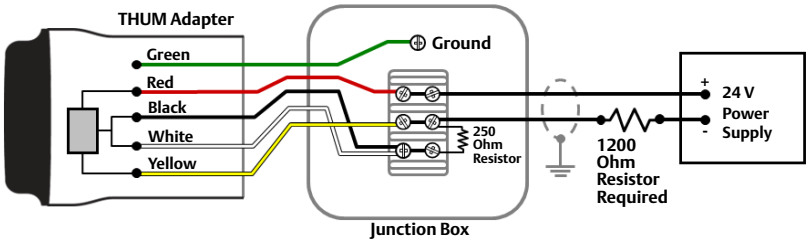


Figure 3-18. THUM adapter only, powered by a 24 V power supply with 1200 Ohm resistor to limit current to 20 mA

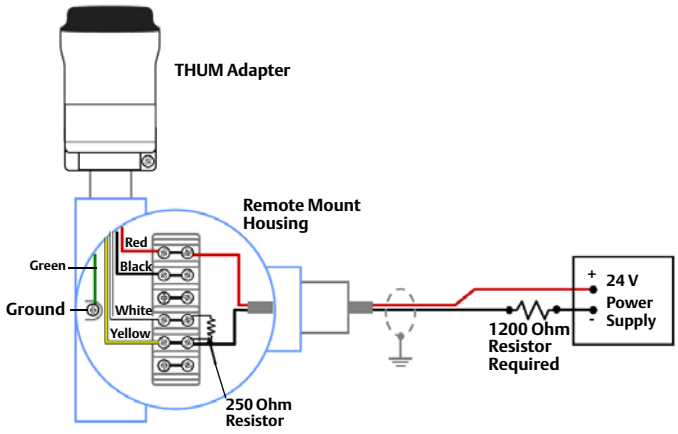


Figure 3-19. Wiring diagram for 2-wire device

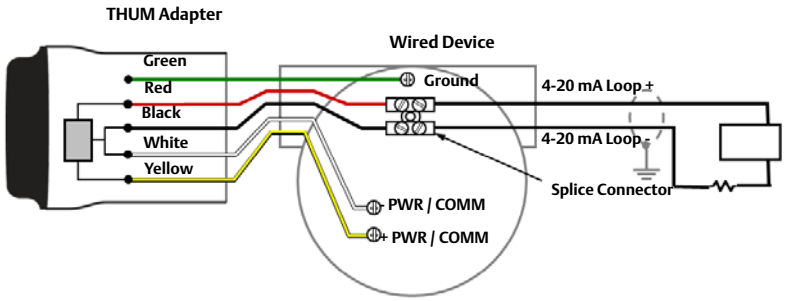
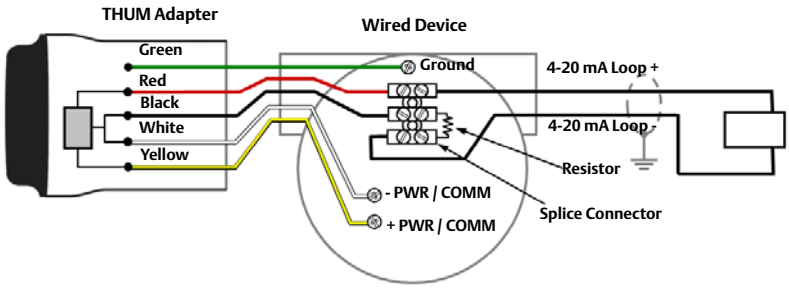


Figure 3-20. Wiring diagram for 2-wire device with resistor



Note

A passive loop exists when the wired device is not supplying power to the 4-20 loop. It is important to verify if the wired device is operating in active or passive mode.

Figure 3-21. Wiring diagram for 4-wire passive device

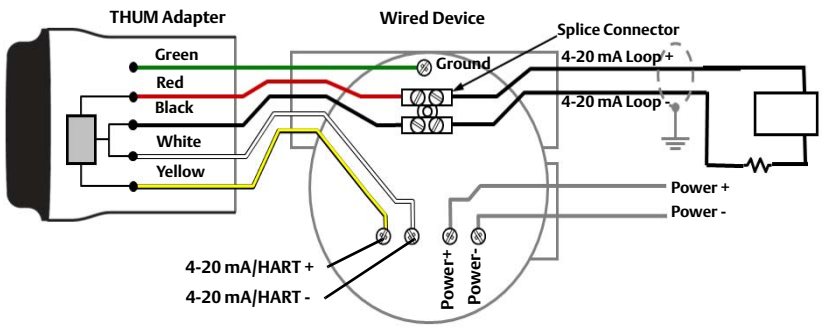
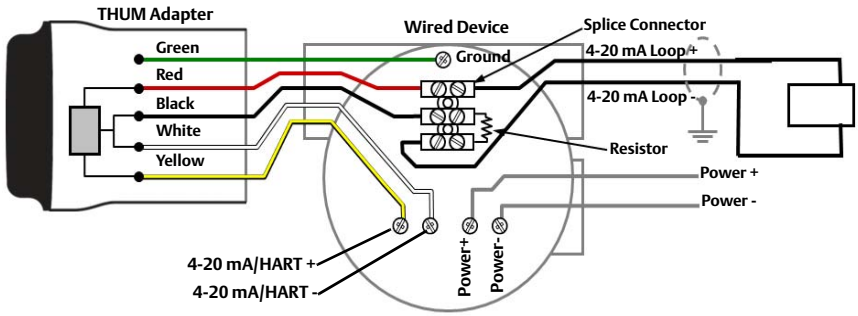


Figure 3-22. Wiring diagram for 4-wire passived device with resistor



Note

An active loop exists when the wired device is supplying power to the 4-20 mA loop. It is important to verify if the wired device is operating in an active or passive mode.

Figure 3-23. Wiring diagram for 4-wire active device

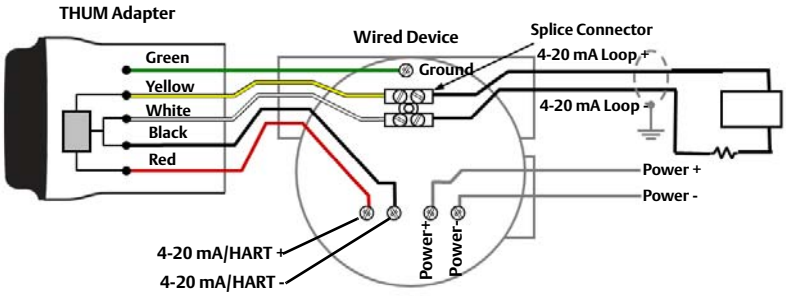


Figure 3-24. Wiring diagram for 4-wire active device with resistor

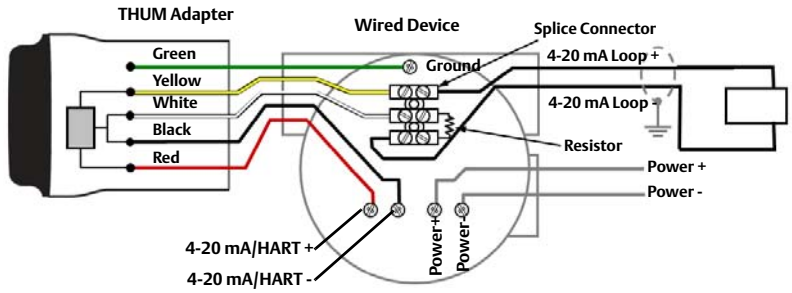


Figure 3-25. Wiring diagram for 4-wire active device with no 4-20 mA loop

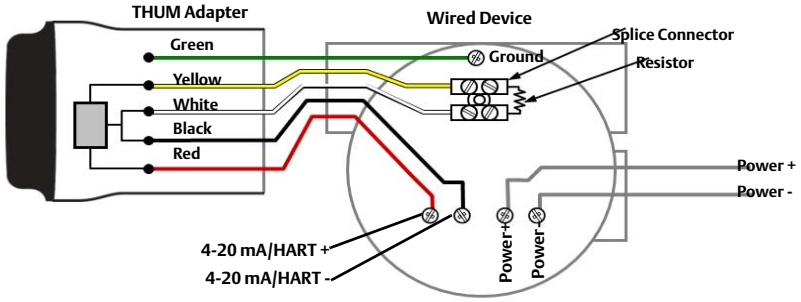
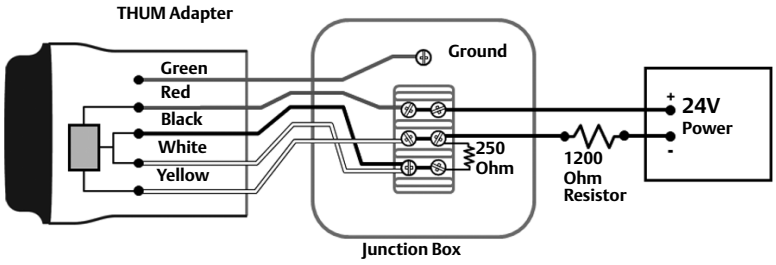


Figure 3-26. Wiring diagram for THUM adapter as router, no wired device



The 1200 Ohm resistor should be adequately rated for the application (3W minimum).

3.3 Loop current test

To verify that the THUM Adapter will work under all conditions, a loop current test should be performed. This test will exercise the loop under the highest possible voltage drop conditions.

1. Place loop in manual control.
2. Drive loop to high alarm level. For details, see wired device instruction manual.
   - When the THUM Adapter is connected to a valve, this will need to be done at the current source and not from the valve.
   - When the THUM Adapter is connected to a transmitter, this will need to be performed at the transmitter.
3. Place the THUM Adapter into fixed voltage drop mode.

AMS Device Manager

Right click on the THUM Adapter and select **Configure**. When the menu opens, select **Manual Setup** from the window on the left and select the *Wired Device* tab on the top. Make sure that the *Time* drop down menu at the bottom of the page has **Current** selected. Under the *Voltage Drop* drop down menu in the *Smart Power Options* box, select **Fixed Voltage Drop**. Hit the **Apply** button to make any changes. See Figure 3-27 on page 27.

Field communicator

When communicating to the THUM Adapter select: **Configure - Manual setup - Wired Device - Voltage Drop Mode**. In the method choose **Fixed Voltage Drop.**

Function	Key sequence	Menu items
Voltage Drop	2,2,2,2	Voltage Drop

4. Verify that the current on the loop reaches the high alarm levels.
5. Place the THUM Adapter into variable voltage drop mode.

AMS Device Manager

Right click on the THUM Adapter and select **Configure**. When the menu opens, select **Manual Setup** from the window on the left and select the *Wired Device* tab on the top. Make sure that the *Time* drop down menu at the bottom of the page has **Current** selected. Under the *Voltage Drop* drop down menu in the *Smart Power Options* box, select **Variable Voltage Drop**. Hit the **Apply** button to make any changes. See Figure 3-27.

Field communicator

When communicating to the THUM Adapter select: **Configure - Manual setup - Wired Device - Voltage Drop Mode**. In the method choose **Variable Voltage Drop**.

Function	Key sequence	Menu items
Voltage Drop	2,2,2,2	Voltage Drop

Section 4 Commissioning

Safety messages . . . . . page 29
Device network configuration . . . . . page 30

4.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

4.1.1 Warnings

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Only qualified personnel should perform the installation.

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure that the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals.

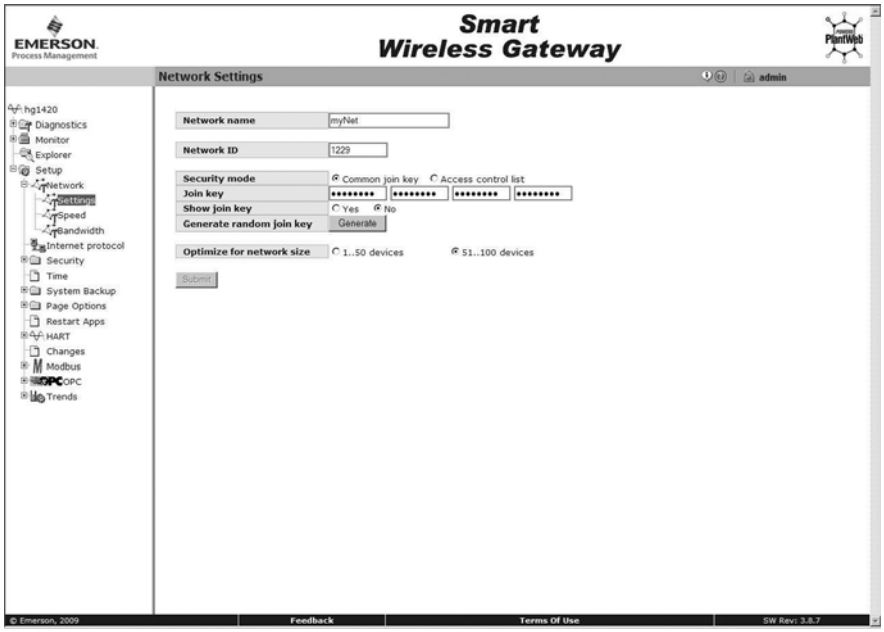
This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

4.2 Device network configuration

In order to communicate with the Smart Wireless Gateway, and ultimately the Information System, the transmitter must be configured to communicate with the wireless network. This step is the wireless equivalent of connecting wires from a transmitter to the information system. Using a Field Communicator or AMS, enter the Network ID and Join Key so that they match the Network ID and Join Key of the gateway and other devices in the network. If the **Network ID and Join Key** are not identical, the THUM Adapter will not communicate with the network. The Network ID and Join Key may be obtained from the Smart Wireless Gateway on the **Setup>Network>Settings** page on the web server, shown in Figure 4-1.

Figure 4-1. Gateway network setting



AMS

Right click on the THUM Adapter and select **Configure**. When the menu opens, select **Join Device to Network** and follow the method to enter the Network ID and Join Key.

Field communicator

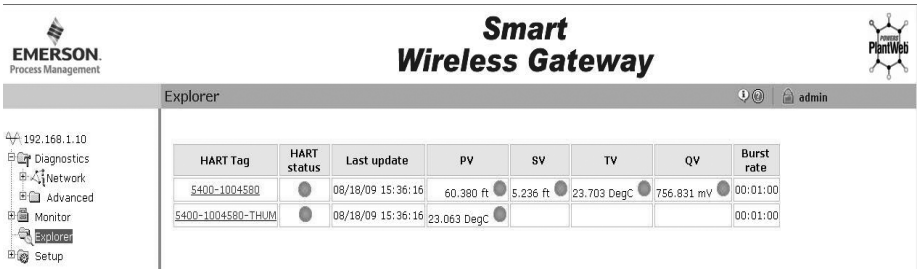
The Network ID and Join Key may be changed in the wireless device by using the following Fast Key sequence. Set both Network ID and Join Key.

Operation can be verified in three locations: by using the Field Communicator, at the Gateway via the Smart Wireless Gateway's integrated web server, or via AMS™ Wireless Configurator.

Function	Key sequence	Menu items
Wireless Setup	1,4	Smart Power, Network ID, Set Join Key, Radio State

4.2.1 Network status

If the THUM Adapter was configured with the Network ID and Join Key and sufficient time for network polling has passed, the transmitter should be connected to the network. To verify connectivity, open the Smart Wireless Gateway's integral web interface and navigate to the Explorer page.



This page will display the THUM Adapter's HART tag, PV, SV, TV, QV, and Update Rate. A green status indicator means that the device is working properly. A red indicator means that there is a problem with either the device or its communication path. For more detail on a specific device, click on the tag name.

4.2.2 Verify operation

Operation can be verified in three locations: by using the 375 Field Communicator, at the Gateway via the Smart Wireless Gateway's integrated web server, or via AMS™ Wireless Configurator.

Field communicator

In order for the THUM adapter to communicate with a Field Communicator, a THUM adapter DD is required. The Field Communicator must be put into a polling mode using the THUM adapter address of 63. Connect the Field Communicator to the wired device. The Field Communicator should find both the THUM adapter and the wired device.

Table 4-1. Field Communicator connections

Function	Key sequence	Menu items
Communications	3, 3	Join Status, Wireless Mode, Join Mode, Number of Available Neighbors, Number of Advertisements Heard, Number of Join Attempts

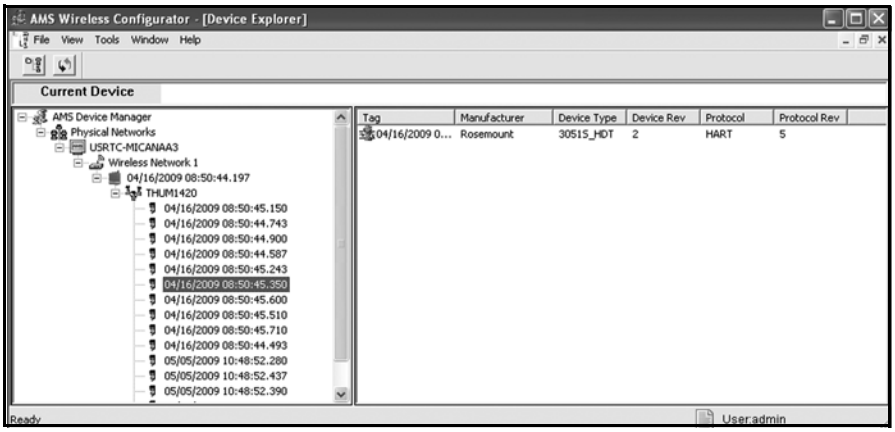
Smart Wireless Gateway

If the THUM Adapter was configured with the Network ID and Join Key, and sufficient time has passed for network polling, the transmitter will be connected to the network. To verify device operation and connection to the network with the Smart Wireless Gateway's integrated web server, open the Smart Wireless Gateway's integral web interface and navigate to the Explorer page.

Note
It may take several minutes for the device to join the network.

AMS Wireless Configurator

When the device has joined the network, it will appear in the Wireless Configurator as illustrated below.



Troubleshooting

If the device is not operating properly, refer to the troubleshooting section of the manual. The most common cause of incorrect operation is the Network ID and Join Key. The Network ID and Join Key in the device must match that of the Smart Wireless Gateway.

The Network ID and Join Key may be obtained from the Smart Wireless Gateway on the **Setup>Network>Settings** page on the web server. The Network ID and Join Key may be changed in the wireless device by using the following Fast Key sequence.

Reference information

Function	Key sequence	Menu items
Wireless Setup	1, 4	Smart Power, Network ID, Set Join Key, Radio State

Note
In order to communicate with a Field Communicator, the wired device must be powered.

Table 4-2. THUM adapter HART fast key sequence

Function	Key sequence	Menu items
Device Info	2, 2, 4, 3	Manufacturer, Model, Final Assembly Number, Universal, Field Device, Software, Hardware, Descriptor, Message, Date, Model Number I, II, III, SI Unit Restriction, Country
Guided Setup	2, 1	Configure, Guided Setup, Join Device to Network, Configure Update Rate, Zero Trim, Configure Device Display, Configure Process Alarms
Manual Setup	2, 2	Configure, Manual Setup, Wireless, Pressure, Device Temperatures, Device Information, Display, Other
Wireless	2, 2, 1	Network ID, Join Device to Network, Configure Update Rate, Configure Broadcast Power Level, Power Mode, Power Source

Section 5 Operation and maintenance

Safety messages . . . . . page 33
Startup sequence . . . . . page 33
Advanced setup . . . . . page 34

5.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

5.1.1 Warnings

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Only qualified personnel should perform the installation.

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure that the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

5.2 Startup sequence

Because the THUM is a power scavenging device, different capabilities are available at different times after startup. Configuration is available immediately after startup and includes Update Rate and Discovery method. All network settings including Network ID, Join Key can not be set until the radio is completely initialized. This may take up to three (3) minutes after startup.

After this amount of time has passed, the THUM adapter will start to join the network. Time to join the network depends on network size and number of devices and if active advertising is turned on in the Gateway. After sufficient time to join has passed go to the Explorer page on the Smart Wireless Gateway to see if the THUM has joined.

5.3 Advanced setup

5.3.1 Configure advanced update rate

Fast Keys	2, 2, 1,3

The “Configure Update Rate” method sets all three update rates based on one user input. The “configure Advanced Update Rate” method allows for each update rate to be set independently of the other two. Values for all update rates are between 8 seconds and 60 minutes. Only one update rate can be set to 8 seconds.

In AMS Select **Manual Setup** and then the **Wireless** tab.

5.3.2 4-20 mA current

Fast Keys	2, 2, 2,1

This optimizes the THUM Adapter to the available loop current.

There are two options “Variable Current Mode” and “Fixed Current Mode”. Variable current mode is the default mode and is used when the current on the loop is changing between 3.5 mA to 25 mA.

Fixed Current mode is user selectable. This mode is for when the current on the loop is fixed and will not drop below 15 mA. If the current drops below 15 mA when the THUM Adapter is in fixed current mode, there may be issues with network traffic, and the THUM Adapter may drop off of the wireless network. The HART loop will not be affected.

In AMS Select **Manual Setup** and then the **Wired Device** tab.

5.3.3 Voltage drop

Fast Keys	2, 2, 2,2

This optimizes the THUM Adapter to the available voltage on the loop. There are two options: Variable and Fixed. Variable is the default mode. In Variable mode the THUM drops between 2.25 V at 3.5 mA and 1.2 V at 25 mA. In Fixed mode the THUM will always drop 2.25 volts. Fixed mode is used for verifying that there is enough voltage on the loop in the loop check procedure.

In AMS Select **Manual Setup** and then the **Wired Device** tab.

5.3.4 Discovery mode

Fast Keys	2, 2, 2,3

The discovery mode is how the THUM Adapter determines which wired device it will update for. There are 3 modes “First Device Found”, “Fixed Polling Address”, and “Fixed Mapping”. The default mode is First Device Found. In First Device Found Mode, the THUM Adapter will update for the first wired device that it finds on the wired bus. This mode is best used when there is only one device on the wired bus. If more than one wired device is found, the THUM Adapter will go into alert.

In Fixed Polling Address mode, the THUM will only update for a wired device at specific HART polling address. Any address can be entered. If no device is found at this address, the THUM Adapter will go into an alarm state.

In Fixed Mapping mode, the user selects the long tag from a list of devices that are currently on the wired bus. If the selected device goes off line, the THUM will not start updating new device, and will go into an alarm state.

In AMS Select **Manual Setup** and then the **Wired Device** tab.

5.3.5 Configure HART polling

Fast Keys	2, 2, 2,4

The Configure HART Polling method allows the user to select which commands the THUM Adapter will update for the wired device. The user can select from pre setup information or select custom and enter the HART command that they would like to have the THUM Adapter update for the wired device.

In AMS Select **Manual Setup** and then the **Wired Device.**

5.3.6 Configure router only mode

Fast Keys	2, 2, 5,2

This mode will set the THUM Adapter up as a router only device. The THUM Adapter will no longer look for wired devices or update for any wired device that is on the HART loop. The THUM Adapter will continue to send updates for itself and will also act as a wireless node in the wireless network.

In AMS Select **Manual Setup** and then the **Other** tab.

5.3.7 HART address

Fast Keys	2, 2, 5,3

This is the HART Polling address of the THUM adapter. This can be changed from 0 to 63. This is used when using wired HART communication to talk with the THUM. The THUM Adapter default HART polling address is 63.

In AMS Select **Manual Setup** and then the **Other** tab.

5.3.8 HART master

Fast Keys	2, 2, 5,4

Here is where the user can set the THUM Adapter to either a primary or secondary HART master. The THUM is set to primary as default, if another primary master is on the HART loop it may be necessary to change the THUM Adapter to a secondary master. This will not affect the functionality of the THUM Adapter. The number of retries can be set to between 2 and 5.

In AMS Select **Manual Setup** and then the **Other** tab.

Section 6 Troubleshooting

Overview . . . . . page 37
Troubleshooting recommended actions . . . . . page 38

6.1 Overview

Table 6-1 on page 38 provides summarized maintenance and troubleshooting suggestions for the most common operating problems.

If you suspect malfunction despite the absence of any diagnostic messages on the Field Communicator display, follow the procedures described here to verify that transmitter hardware and process connections are in good working order. Always deal with the most likely checkpoints first.

6.1.1 Warnings

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Only qualified personnel should perform the installation.

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure that the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

Table 6-1. Troubleshooting recommended actions

Symptom	Recommended action
Wired troubleshooting	
Wired device does not turn on when THUM Adapter is added to loop	Check the wiring and connections between THUM Adapter and wired device Verify that enough voltage is being supplied to power both the THUM Adapter and wired device
Wired Device does not function properly through loop check	Determine total voltage drop of system assume 2.5 volts for THUM Adapter Verify that enough voltage is on the loop
Can not communicate with wired device or THUM Adapter	Verify that wiring is correct Verify that enough voltage is being supplied to power both THUM Adapter and wired device Verify that between 250 and 1100 Ohms resistance is present
Can not communicate with THUM Adapter	Verify that wiring is correct Verify that enough voltage is being supplied to power both THUM Adapter and wired device Verify that between 250 and 1100 Ohms resistance is present Verify that Field communicator or AMS Device Manager is set to poll for THUM Adapter address Power Cycle device to try again
Configuration troubleshooting	
Can not configure THUM Adapter with 375 or AMS Device Manager	Make sure that the correct DD is loaded into the 375 or AMS Device Manager
THUM Adapter does not communicate with wired device	Run the “Configure Discovery Mode” method to connect the THUM Adapter to wired device Check the wiring and connections between THUM Adapter and wired device Verify that between 250 and 1100 Ohms resistance is present for HART communications Verify that the wired device is functioning properly Power Cycle device to try again
Duplicate HART Master Detected	Verify that two primary masters are on the loop Then set the THUM Adapter into secondary master mode Power Cycle device to try again If THUM Adapter is in secondary master mode and 375 or AMS Device Manager is connected to loop this error will occur The error will disappear after the 375 or AMS Device Manager is removed from the loop.
Wireless network troubleshooting	
THUM Adapter not joining network	Verify network ID and join key Wait longer (30 min.) Verify THUM Adapter is within range of at least one other device Verify network is in active network advertise Power Cycle device to try again Verify device is configured to join. Send the “Force Join” command to the device See troubleshooting section of Smart Wireless Gateway for more information
Limited Bandwidth Error	Reduce the Update Rate on THUM Adapter and wired device Increase communication paths by adding more wireless points Check that THUM Adapter has been online for at least an hour Check that THUM Adapter is not routing through a “limited” routing node Create a new network with an additional Smart Wireless Gateway

Appendix A Reference data

Functional specifications . . . . . page 39
Physical specifications . . . . . page 39
Performance specifications . . . . . page 40
Dimensional drawings . . . . . page 41
Ordering information . . . . . page 43

A.1 Functional specifications

Input

Any 2- or 4-wire HART powered device.

Output

IEC 62591 (WirelessHART)

Humidity limits

0–100% relative humidity

Update rate

User selectable, 8 sec. to 60 min.

A.2 Physical specifications

Electrical connections

The THUM is connected into a powered 4–20 mA loop, powering itself by scavenging power. The THUM causes a voltage drop across the loop. The drop is linear from 2.25 volts at 3.5 mA to 1.2 volts at 25 mA, but does not effect the 4–20 mA signal on the loop. Under fault conditions, the maximum voltage drop is 2.5 volts.

Power supply

Minimum load on loop 250 Ohms.
To maintain normal operating functions of the sub-device, the power in the loop must have at least a 2.5 V margin at a 250 Ohm load.
Limit power supply to 0.5 Amps maximum.
Limit power supply to 55 Vdc maximum.

Field Communicator connections

Utilize sub-device HART connections.

Materials of construction

Housing option D - Low-copper aluminum

Housing option E - 316 SST
Paint - Polyurethane
M20-Conduit Adapter - SST
M20-Conduit Adapter O-ring - Buna-n

Antenna

Poly butadine terephthalate (PBT) / Polycarbonate (PC) integrated omnidirectional antenna

Weight

THUM Adapter only AL - 0.65 lbs. (0.29 kg)
THUM Adapter only SST - 1.1 lbs. (0.5 kg)
AL THUM Adapter with AL remote kit - 3.2 lbs. (1.45 kg)
SST THUM Adapter with SST remote kit - 5.8 lbs. (2.65 kg)
AL THUM Adapter with M20 conduit adapter - 0.85 lbs. (.038 kg)
SST THUM Adapter with M20 conduit adapter - 1.3 lbs. (0.59 kg)

Enclosure ratings

Housing option code D is NEMA 4X, and IP66.

Mounting

The THUM Adapter may be attached directly to the conduit of any 2- or 4-wire HART device or mounted remotely by using the remote mount kit.

A.3 Performance specifications

ElectroMagnetic compatibility (EMC)

All Models:
Meets all relevant requirements of EN 61326-1 (2006) when installed with shielded wiring. The sub-device must also use shielded wiring for installation.

Vibration effect

Output unaffected when tested per the requirements of IEC60770-1 field with general application or pipeline with low vibration level (10-60 Hz 0.15 mm displacement peak amplitude / 60-500 Hz 2g).

When the THUM Adapter is used on wired devices that are subject to vibration levels greater than 2g, it is recommended that the THUM Adapter be remotely mounted using the remote mount kit.

Temperature limits

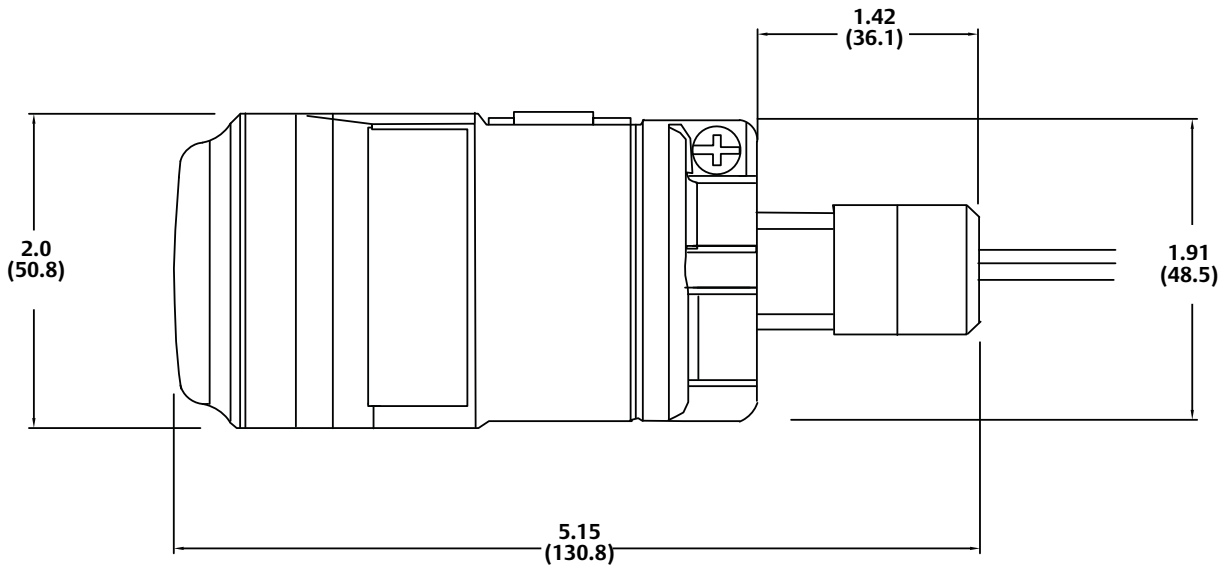
Operating limit	Storage limit
–40 to 185 °F	–40 to 185 °F
–40 to 85 °C	–40 to 85 °C

Output specifications

The THUM allows Wireless communication between the HART device it is connected to and the Smart Wireless Gateway.

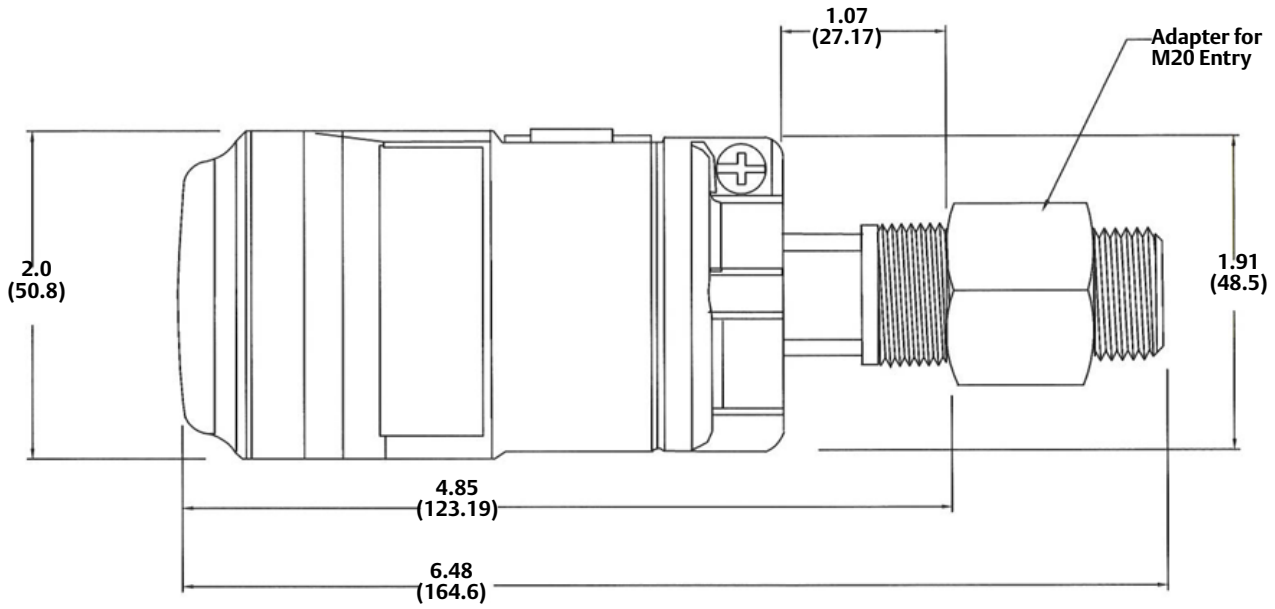
A.4 Dimensional drawings

THUM Adapter 1/2 NPT



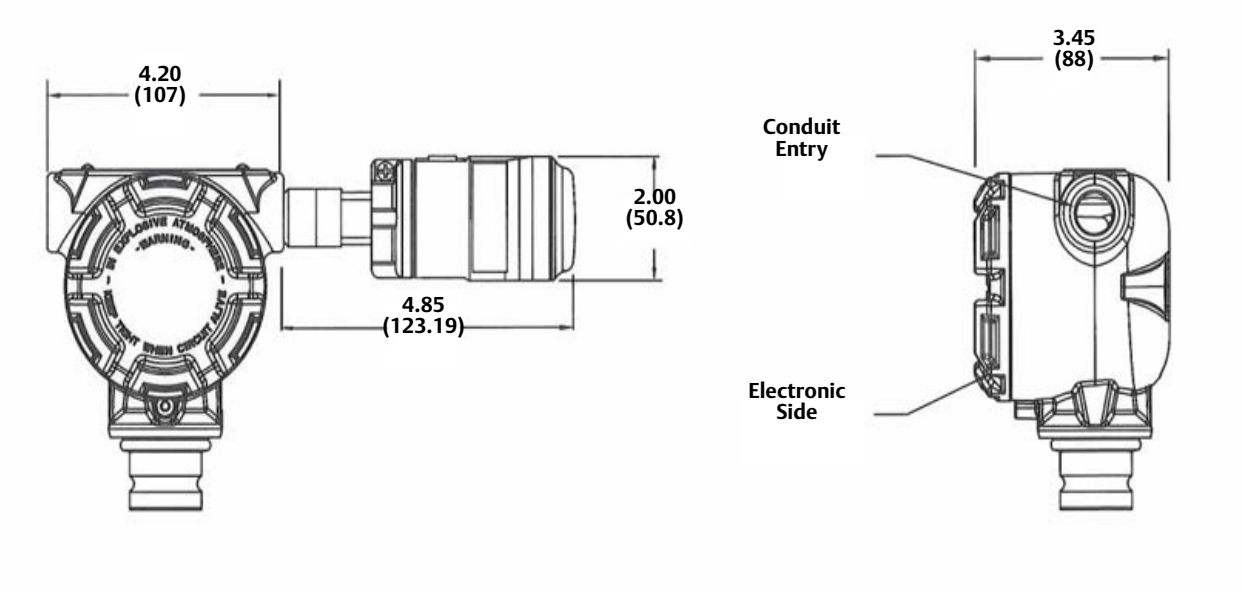
Dimensions are in inches (millimeters).

THUM Adapter with M20 conduit adapter



Dimensions are in inches (millimeters).

THUM Adapter with remote mount kit



Dimensions are in inches (millimeters).

A.5 Ordering information

Table A-1. Smart Wireless THUM Adapter ordering information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Model	Product description	
775	Smart Wireless THUM Adapter	
Output		
X	Wireless	
Housing		
Standard		**Standard**
D	Aluminum	★
Expanded		**Expanded**
E	SST	
Mounting connection		
Standard		**Standard**
1	1/2 - 14 NPT	★
2	M20-Conduit Adapter	★
PlantWeb functionality		
Standard		**Standard**
1	HART Data	★
Certification		
Standard		**Standard**
NA	No Approval	★
I5	FM Intrinsically Safe, Non-incendive	★
I6	CSA Intrinsically Safe	★
I1	ATEX Intrinsic Safety	★
N1	ATEX Type n	★
I7	IECEx Intrinsic Safety	★
N7	IECEx Type n	★
I2	INMETRO Intrinsic Safety	★
N2	INMETRO Type n	★
I3	China Intrinsic Safety	★
IP	Korea (KOSHA) Intrinsic Safety	★
IW	India (CCOE) Intrinsic Safety	★
IM	GOST (Russia) Intrinsically Safe	★
Wireless update rate, operating frequency, and protocol		
Standard		**Standard**
WA3	User Configurable Update Rate, 2.4 GHz DSSS, WirelessHART	★
Omnidirectional, wireless antenna, and SmartPower™ options		
Standard		**Standard**
WK9	Long range, Integral Antenna, Power Scavenging	★
Typical model number: 775XD11I5WA3WK9		

A.6 Accessories and spare parts

Table A-2. Accessories

Item description	Part number
Remote Mount Kit - AI	00775-9000-0001
Remote Mount Kit - SST	00775-9000-0011
M20-Conduit Adapter	00775-9001-0001

Appendix B Product Certifications

Approved Manufacturing Locations . . . . . page 45
European Directive Information . . . . . page 45
Telecommunication Compliance . . . . . page 45
FCC and IC . . . . . page 46
Ordinary Location Certification for FM . . . . . page 46
Hazardous Locations Certificates . . . . . page 46

B.1 Approved Manufacturing Locations

Rosemount Inc. – Chanhassen, Minnesota, USA

Emerson Process Management GmbH & Co. - Karlstein, Germany

Emerson Process Management Asia Pacific Private Limited - Singapore

B.2 European Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found at www.rosemount.com. A hard copy may be obtained by contacting an Emerson Process Management representative.

ATEX Directive (94/9/EC)

Emerson Process Management complies with the ATEX Directive.

Electro Magnetic Compatibility (EMC) (2004/108/EC)

Emerson Process Management complies with the EMC Directive.

Radio and Telecommunications Terminal Equipment Directive (R&TTE) (1999/5/EC)

Emerson Process Management complies with the R&TTE Directive.

B.3 Telecommunication Compliance

All wireless devices require certification to ensure that they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification. Emerson is working with governmental agencies around the world to supply fully compliant products and remove the risk of violating country directives or laws governing wireless device usage.

B.4 FCC and IC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) this device must accept any interference, including any interference that may cause undesired operation of the device.

Cet appareil est conforme à la norme RSS Industrie Canada exempt de licence. Son fonctionnement est soumis aux deux conditions suivantes: (1) cet appareil ne doit pas provoquer d'interférences et (2) cet appareil doit accepter toute interférence, y compris les interferences pouvant causer un mauvais fonctionnement du dispositif.

B.5 Ordinary Location Certification for FM

As standard, the transmitter has been examined and tested to determine that the design meets basic electrical, mechanical, and fire protection requirements by FM, a nationally recognized testing laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

B.6 Hazardous Locations Certificates

North American Certifications

Factory Mutual (FM) Approvals

I5 FM Intrinsically Safe and Non-incendive
Intrinsically Safe for Class I/II/III, Division 1, Groups A, B, C, D, E, F, and G.
Zone Marking: Class I, Zone 0, AEx ia IIC
Temperature Codes T4(-50 °C ≤ T_a ≤ 70 °C)
Non-incendive for Class I, Division 2, Groups A, B, C, and D.
Intrinsically safe and non-incendive when installed according to Rosemount Drawing 00775-0010.
Enclosure Type 4X/IP66

CSA - Canadian Standards Association

I6 CSA Intrinsically Safe
Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D.
T3C(-50 °C ≤ T_a ≤ 70 °C)
Intrinsically safe when installed according to Rosemount Drawing 00775-0012.
Suitable for Class I, Division 2, Groups A, B, C, and D.
Enclosure Type 4X/IP66

European Certifications

I1 ATEX Intrinsic Safety
Certificate: Baseefa09ATEX0125X ⟨Ex⟩ II 1G
Ex ia IIC T4(-50 °C ≤ T_a ≤ 70 °C)
IP66
CE 1180

Table B-1. Input Parameters

Loop power
U_i = 30 V
I_i = 200 mA
P_i = 1.0 W
C_i = 0
L_i = 0

Special Conditions for Safe Use (X):

The surface resistivity of the antenna is greater than one gigaohm. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

The enclosure is made of aluminium alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in a zone 0.

N1 ATEX Type n
Certificate: Baseefa09ATEX0131 ⟨Ex⟩ II 3 G
Ex nA IIC T4 (-50 °C ≤ T_a ≤ 70 °C)
U_i = 45 Vdc MAX
IP66
CE 1180

IECEx Certifications

I7 IECEx Intrinsic Safety
Certificate: IECEx BAS 09.0050X
Ex ia IIC T4(-50 °C ≤ T_a ≤ 70 °C)
IP66

Table B-2. Input Parameters

Loop power
U_i = 30 V
I_i = 200 mA
P_i = 1.0 W
C_i = 0
L_i = 0

Special Conditions for Safe Use (X):

The surface resistivity of the antenna is greater than one gigaohm. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

The enclosure is made of aluminium alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in a zone 0.

N7 IECEx Type n
Certificate: IECEx BAS 09.0058
Ex nA IIC T4 (-50 °C ≤ T_a ≤ 70 °C)
U_i = 45 Vdc MAX
IP66

INMETRO Certifications

I2 Intrinsic Safety
BR-Ex ia IIC T4 (-50 °C ≤ T_a ≤ 70 °C) Ga

N2 INMETRO Type 'n'
BR-Ex nA IIC T4 Gc (-50 °C ≤ T_a ≤ 70 °C)

China (NEPSI) Certifications

I3 China (NEPSI) Intrinsic Safety
Ex ia IIC T4

CCoE Certifications

IW Intrinsic Safety
Ex ia IIC T4

KOSHA Certifications

IP Intrinsic Safety
Ex ia IIC T4

GOST Certifications

IM Intrinsically Safe
Ex ia IIC T4 (-50 °C ≤ T_a ≤ 70 °C)
Ex nA IIC T4 (-50 °C ≤ T_a ≤ 70 °C)
IP66

Figure B-1. 775 THUM FM I.S. & Class 1, Div. 2 Installation Drawing (1 of 2)

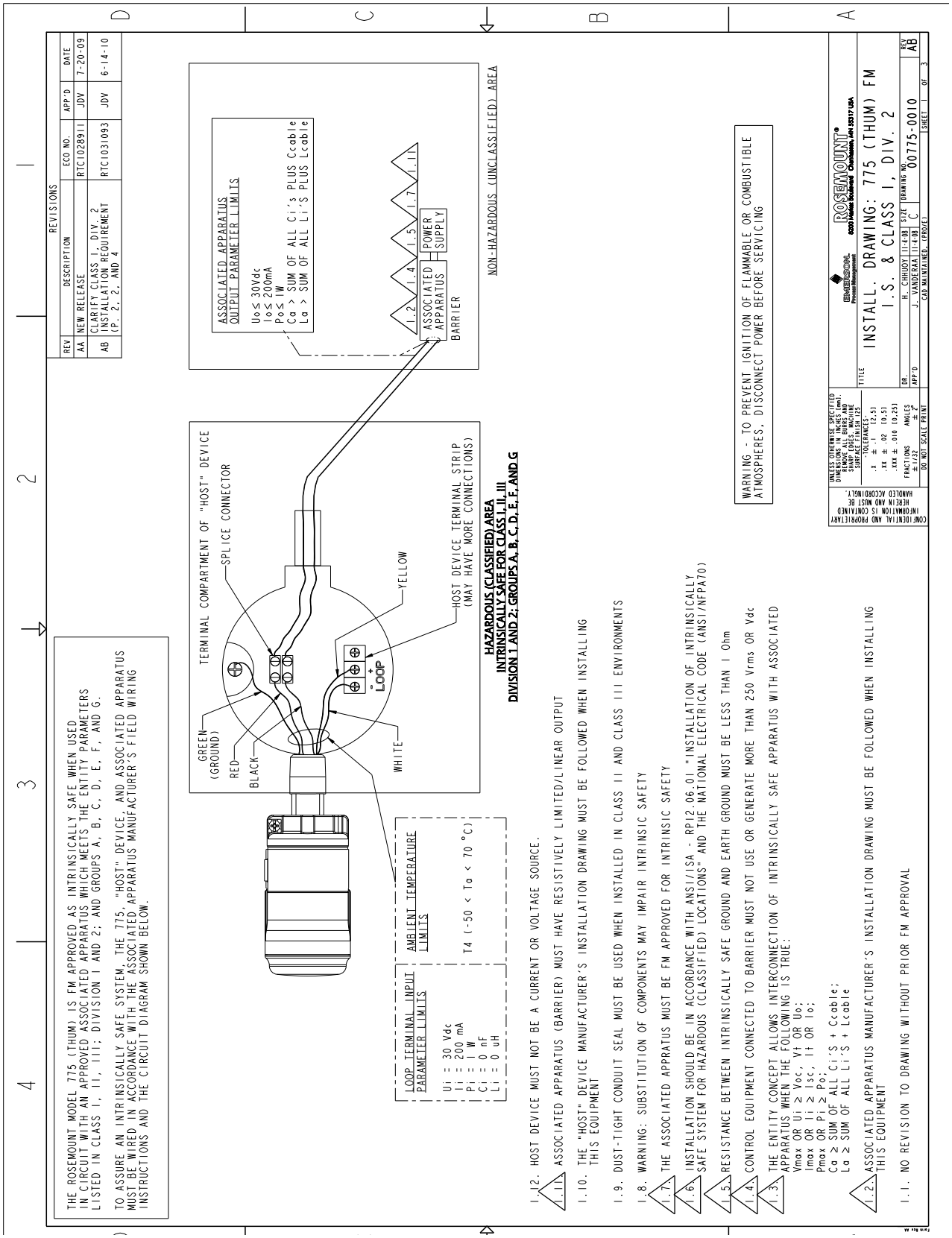

REVISIONS
REV | DESCRIPTION | ECO NO. | APP'D | DATE
AA | NEW RELEASE | RTC1028911 | JDV | 7-20-09
AB | CLARIFY CLASS 1, DIV. 2 INSTALLATION REQUIREMENT (P. 2, 2, AND 4 | RTC1031093 | JDV | 6-14-10
THE ROSEMOUNT MODEL 775 (THUM) IS FM APPROVED AS INTRINSICALLY SAFE WHEN USED IN CIRCUIT WITH AN APPROVED ASSOCIATED APPARATUS WHICH MEETS THE ENTITY PARAMETERS LISTED IN CLASS I, II, III; DIVISION 1 AND 2; AND GROUPS A, B, C, D, E, F, AND G.
TO ASSURE AN INTRINSICALLY SAFE SYSTEM, THE 775, "HOST" DEVICE, AND ASSOCIATED APPARATUS MUST BE WIRED IN ACCORDANCE WITH THE ASSOCIATED APPARATUS MANUFACTURER'S FIELD WIRING INSTRUCTIONS AND THE CIRCUIT DIAGRAM SHOWN BELOW.
LOOP TERMINAL INPUT PARAMETER LIMITS
Ui = 30 Vdc
Ii = 200 mA
Pi = 1 W
Ci = 0 nF
Li = 0 uH
AMBIENT TEMPERATURE LIMITS
T4 (-50 < Ta < 70 °C)
TERMINAL COMPARTMENT OF "HOST" DEVICE
SPLICE CONNECTOR
GREEN (GROUND)
RED
BLACK
WHITE
YELLOW
LOOP
HOST DEVICE TERMINAL STRIP (MAY HAVE MORE CONNECTIONS)
HAZARDOUS (CLASSIFIED) AREA
INTRINSICALLY SAFE FOR CLASS I, II, III
DIVISION 1 AND 2; GROUPS A, B, C, D, E, F, AND G
ASSOCIATED APPARATUS OUTPUT PARAMETER LIMITS
Uo ≤ 30Vdc
Io ≤ 200mA
Po ≤ 1W
Ca > SUM OF ALL Ci's PLUS Ccable
La > SUM OF ALL Li'S PLUS Lcable
ASSOCIATED APPARATUS
BARRIER
POWER SUPPLY
NON-HAZARDOUS (UNCLASSIFIED) AREA
WARNING - TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING
1.12. HOST DEVICE MUST NOT BE A CURRENT OR VOLTAGE SOURCE.
1.11. ASSOCIATED APPARATUS (BARRIER) MUST HAVE RESISTIVELY LIMITED/LINEAR OUTPUT
1.10. THE "HOST" DEVICE MANUFACTURER'S INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT
1.9. DUST-TIGHT CONDUIT SEAL MUST BE USED WHEN INSTALLED IN CLASS II AND CLASS III ENVIRONMENTS
1.8. WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY
1.7. THE ASSOCIATED APPRATUS MUST BE FM APPROVED FOR INTRINSIC SAFETY
1.6. INSTALLATION SHOULD BE IN ACCORDANCE WITH ANSI/ISA - RP12.06.01 "INSTALLATION OF INTRINSICALLY SAFE SYSTEM FOR HAZARDOUS (CLASSIFIED) LOCATIONS" AND THE NATIONAL ELECTRICAL CODE (ANSI/NFPA70)
1.5. RESISTANCE BETWEEN INTRINSICALLY SAFE GROUND AND EARTH GROUND MUST BE LESS THAN 1 Ohm
1.4. CONTROL EQUIPMENT CONNECTED TO BARRIER MUST NOT USE OR GENERATE MORE THAN 250 Vrms OR Vdc
1.3. THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS WITH ASSOCIATED APPARATUS WHEN THE FOLLOWING IS TRUE:
Vmax OR Ui ≥ Voc; Vt OR Uo;
Imax OR Ii ≥ Isc; It OR Io;
Pmax OR Pi ≥ Po;
Ca ≥ SUM OF ALL Ci'S + Ccable;
La ≥ SUM OF ALL Li'S + Lcable
1.2. ASSOCIATED APPARATUS MANUFACTURER'S INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT
1.1. NO REVISION TO DRAWING WITHOUT PRIOR FM APPROVAL
CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY.
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm] REMOVE ALL BURRS AND SHARP EDGES, MAXIMUM SURFACE FINISH 125
TOLERANCES: .X ± .1 [2.5] .XX ± .02 [0.5] .XXX ± .010 [0.25] FRACTIONS ± 1/64 ANGLES ± 1°
DO NOT SCALE PRINT
ROSEMOUNT 8200 Market Boulevard Chanhassen, MN 55317 USA
TITLE
INSTALL. DRAWING: 775 (THUM) FM I.S. & CLASS I, DIV. 2
DR H. CHUHOY 11-4-08
APP'D J. VANDERAA 11-4-08
SIZE C
DRAWING NO. 00775-0010
REV AB
SHEET 1 OF 3
COD MAILWORD, (PROE)

Figure B-2. 775 THUM FM I.S. & Class 1, Div. 2 Installation Drawing (2 of 2)

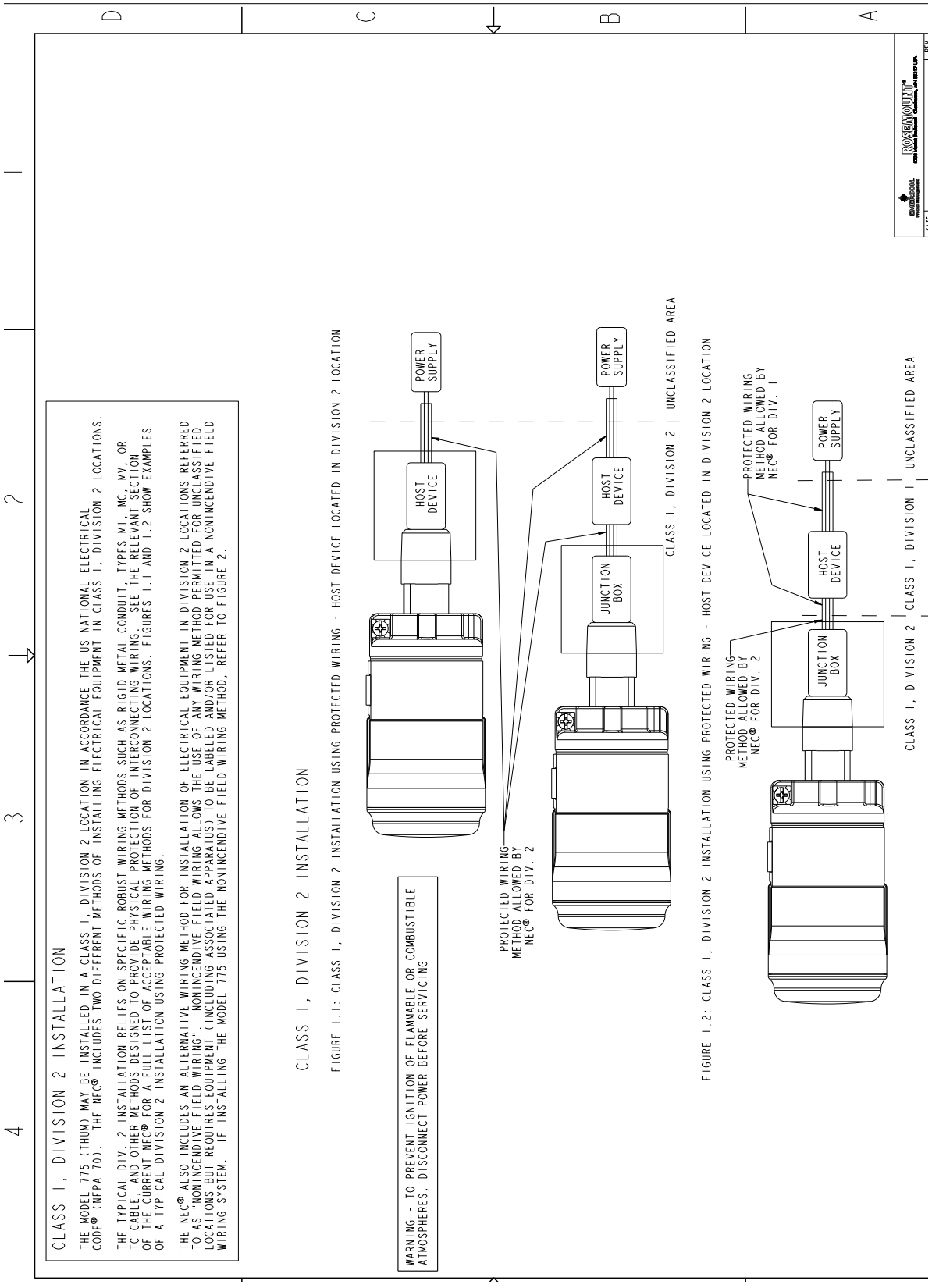

CLASS I, DIVISION 2 INSTALLATION
THE MODEL 775 (THUM) MAY BE INSTALLED IN A CLASS I, DIVISION 2 LOCATION IN ACCORDANCE THE US NATIONAL ELECTRICAL CODE® (NFPA 70). THE NEC® INCLUDES TWO DIFFERENT METHODS OF INSTALLING ELECTRICAL EQUIPMENT IN CLASS I, DIVISION 2 LOCATIONS.
THE TYPICAL DIV. 2 INSTALLATION RELIES ON SPECIFIC ROBUST WIRING METHODS SUCH AS RIGID METAL CONDUIT, TYPES MI, MC, MV, OR TC CABLE, AND OTHER METHODS DESIGNED TO PROVIDE PHYSICAL PROTECTION OF INTERCONNECTING WIRING. SEE THE RELEVANT SECTION OF THE CURRENT NEC® FOR A FULL LIST OF ACCEPTABLE WIRING METHODS FOR DIVISION 2 LOCATIONS. FIGURES I.1 AND I.2 SHOW EXAMPLES OF A TYPICAL DIVISION 2 INSTALLATION USING PROTECTED WIRING.
THE NEC® ALSO INCLUDES AN ALTERNATIVE WIRING METHOD FOR INSTALLATION OF ELECTRICAL EQUIPMENT IN DIVISION 2 LOCATIONS REFERRED TO AS "NONINCENDIVE FIELD WIRING". NONINCENDIVE FIELD WIRING ALLOWS THE USE OF ANY WIRING METHOD PERMITTED FOR UNCLASSIFIED LOCATIONS BUT REQUIRES EQUIPMENT (INCLUDING ASSOCIATED APPARATUS) TO BE LABELED AND/OR LISTED FOR USE IN A NONINCENDIVE FIELD WIRING SYSTEM. IF INSTALLING THE MODEL 775 USING THE NONINCENDIVE FIELD WIRING METHOD, REFER TO FIGURE 2.
WARNING - TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING
CLASS I, DIVISION 2 INSTALLATION
FIGURE I.1: CLASS I, DIVISION 2 INSTALLATION USING PROTECTED WIRING - HOST DEVICE LOCATED IN DIVISION 2 LOCATION
POWER SUPPLY
HOST DEVICE
PROTECTED WIRING METHOD ALLOWED BY NEC® FOR DIV. 2
CLASS I, DIVISION 2 | UNCLASSIFIED AREA
JUNCTION BOX
FIGURE I.2: CLASS I, DIVISION 2 INSTALLATION USING PROTECTED WIRING - HOST DEVICE LOCATED IN DIVISION 2 LOCATION
PROTECTED WIRING METHOD ALLOWED BY NEC® FOR DIV. 2
CLASS I, DIVISION 2 | CLASS I, DIVISION | UNCLASSIFIED AREA
PROTECTED WIRING METHOD ALLOWED BY NEC® FOR DIV. 1
ROSEMOUNT

Figure B-3. 775 THUM CSA I.S. Installation drawing

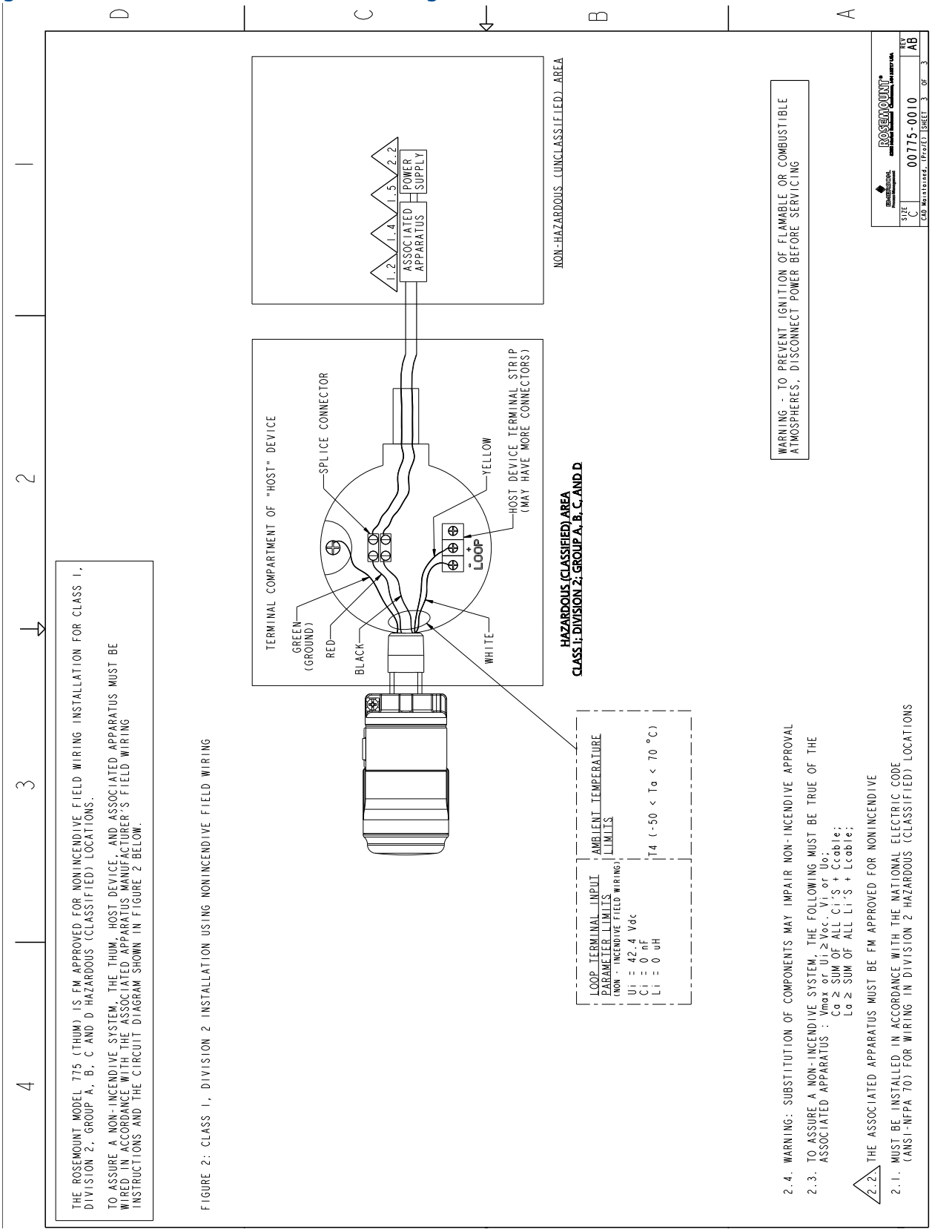
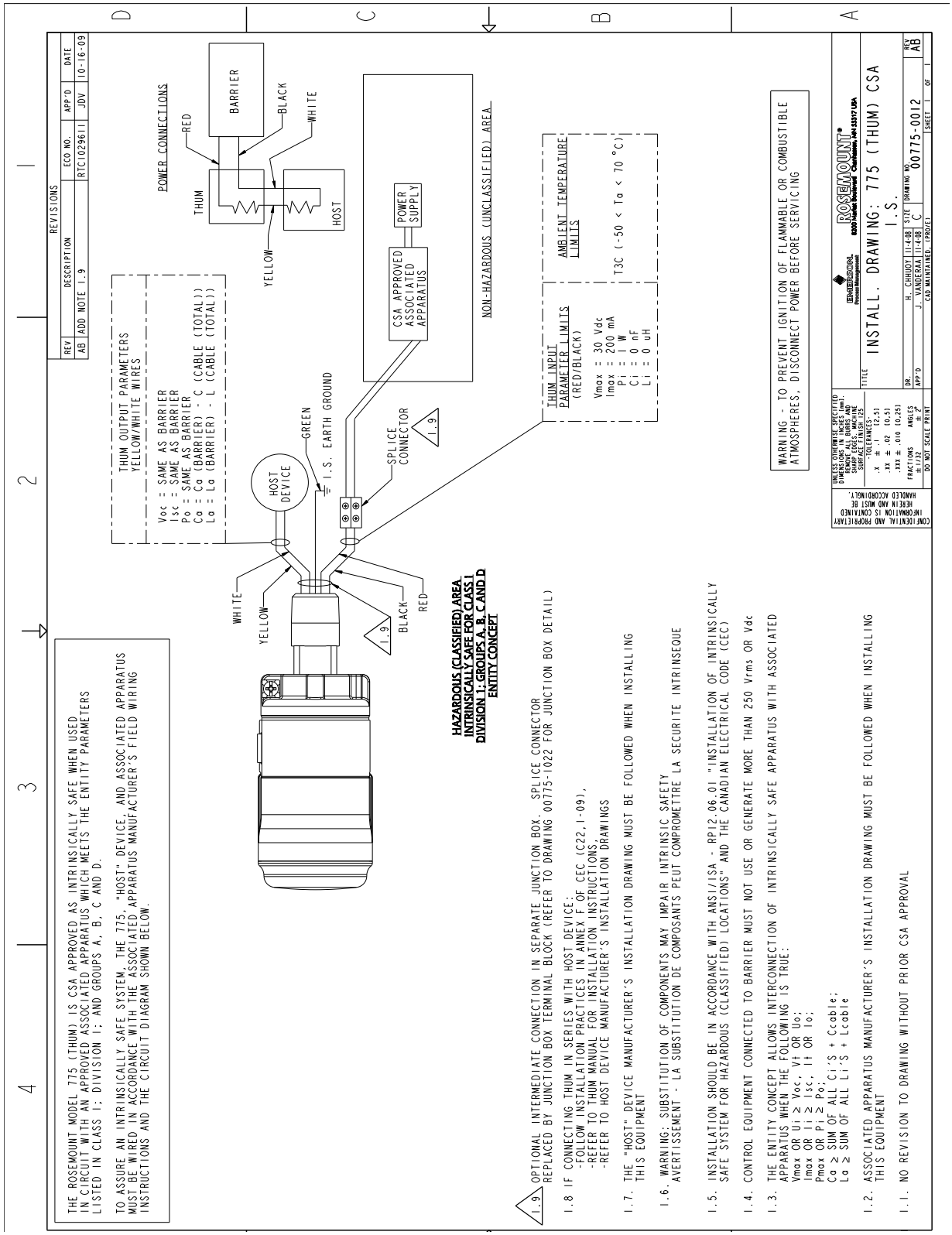

THE ROSEMOUNT MODEL 775 (THUM) IS FM APPROVED FOR NONINCENDIVE FIELD WIRING INSTALLATION FOR CLASS I, DIVISION 2, GROUP A, B, C AND D HAZARDOUS (CLASSIFIED) LOCATIONS.
TO ASSURE A NON-INCENDIVE SYSTEM, THE THUM, HOST DEVICE, AND ASSOCIATED APPARATUS MUST BE WIRED IN ACCORDANCE WITH THE ASSOCIATED APPARATUS MANUFACTURER'S FIELD WIRING INSTRUCTIONS AND THE CIRCUIT DIAGRAM SHOWN IN FIGURE 2 BELOW.
FIGURE 2: CLASS I, DIVISION 2 INSTALLATION USING NONINCENDIVE FIELD WIRING
TERMINAL COMPARTMENT OF "HOST" DEVICE
SPLICE CONNECTOR
GREEN (GROUND)
RED
BLACK
WHITE
YELLOW
HOST DEVICE TERMINAL STRIP (MAY HAVE MORE CONNECTORS)
LOOP
HAZARDOUS (CLASSIFIED) AREA
CLASS I; DIVISION 2; GROUP A, B, C, AND D
NON-HAZARDOUS (UNCLASSIFIED) AREA
ASSOCIATED APPARATUS
POWER SUPPLY
1.2
1.4
1.5
2.2
LOOP TERMINAL INPUT PARAMETER LIMITS (NON - INCENDIVE FIELD WIRING)
Ui = 42.4 Vdc
Ci = 0 nF
Li = 0 uH
AMBIENT TEMPERATURE LIMITS
T4 (-50 < Ta < 70 °C)
WARNING - TO PREVENT IGNITION OF FLAMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING
2.4. WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR NON-INCENDIVE APPROVAL
2.3. TO ASSURE A NON-INCENDIVE SYSTEM, THE FOLLOWING MUST BE TRUE OF THE ASSOCIATED APPARATUS : Vmax or Ui ≥ Voc, Vi or Uo;
Ca ≥ SUM OF ALL Ci'S + Ccable;
La ≥ SUM OF ALL Li'S + Lcable;
2.2. THE ASSOCIATED APPARATUS MUST BE FM APPROVED FOR NONINCENDIVE
2.1. MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (ANSI-NFPA 70) FOR WIRING IN DIVISION 2 HAZARDOUS (CLASSIFIED) LOCATIONS
ROSEMOUNT
SIZE C
00775-0010
REV AB
CAD Maintained, Proe | SHEET 3 OF 3

Figure B-4. 775 THUM CSA Installation Drawing


REVISIONS
REV | DESCRIPTION | ECO NO. | APP'D | DATE
AB | ADD NOTE 1.9 | RTC102961 | JDV | 10-16-09
THE ROSEMOUNT MODEL 775 (THUM) IS CSA APPROVED AS INTRINSICALLY SAFE WHEN USED IN CIRCUIT WITH AN APPROVED ASSOCIATED APPARATUS WHICH MEETS THE ENTITY PARAMETERS LISTED IN CLASS I; DIVISION 1; AND GROUPS A, B, C AND D.
TO ASSURE AN INTRINSICALLY SAFE SYSTEM, THE 775, "HOST" DEVICE, AND ASSOCIATED APPARATUS MUST BE WIRED IN ACCORDANCE WITH THE ASSOCIATED APPARATUS MANUFACTURER'S FIELD WIRING INSTRUCTIONS AND THE CIRCUIT DIAGRAM SHOWN BELOW.
THUM OUTPUT PARAMETERS
YELLOW/WHITE WIRES
Voc = SAME AS BARRIER
Isc = SAME AS BARRIER
Po = SAME AS BARRIER
Ca = Ca (BARRIER) - C (CABLE (TOTAL))
La = La (BARRIER) - L (CABLE (TOTAL))
POWER CONNECTIONS
RED
BLACK
WHITE
YELLOW
THUM
BARRIER
HOST
POWER SUPPLY
CSA APPROVED ASSOCIATED APPARATUS
NON-HAZARDOUS (UNCLASSIFIED) AREA
HOST DEVICE
GREEN
I.S. EARTH GROUND
SPLICE CONNECTOR
1.9
WHITE
YELLOW
BLACK
RED
HAZARDOUS (CLASSIFIED) AREA
INTRINSICALLY SAFE FOR CLASS I
DIVISION 1; GROUPS A, B, C AND D
ENTITY CONCEPT
THUM INPUT
PARAMETER LIMITS
(RED/BLACK)
Vmax = 30 Vdc
Imax = 200 mA
Pi = 1 W
Ci = 0 nF
Li = 0 uH
AMBIENT TEMPERATURE LIMITS
T3C (-50 < Ta < 70 °C)
WARNING - TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING
1.9 OPTIONAL INTERMEDIATE CONNECTION IN SEPARATE JUNCTION BOX. SPLICE CONNECTOR REPLACED BY JUNCTION BOX TERMINAL BLOCK (REFER TO DRAWING 00775-1022 FOR JUNCTION BOX DETAIL)
1.8 IF CONNECTING THUM IN SERIES WITH HOST DEVICE;
-FOLLOW INSTALLATION PRACTICES IN ANNEX F OF CEC (C22.1-09),
-REFER TO THUM MANUAL FOR INSTALLATION INSTRUCTIONS;
-REFER TO HOST DEVICE MANUFACTURER'S INSTALLATION DRAWINGS
1.7. THE "HOST" DEVICE MANUFACTURER'S INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT
1.6. WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY
AVERTISSEMENT - LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE
1.5. INSTALLATION SHOULD BE IN ACCORDANCE WITH ANSI/ISA - RP12.06.01 "INSTALLATION OF INTRINSICALLY SAFE SYSTEM FOR HAZARDOUS (CLASSIFIED) LOCATIONS" AND THE CANADIAN ELECTRICAL CODE (CEC)
1.4. CONTROL EQUIPMENT CONNECTED TO BARRIER MUST NOT USE OR GENERATE MORE THAN 250 Vrms OR Vdc
1.3. THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS WITH ASSOCIATED APPARATUS WHEN THE FOLLOWING IS TRUE:
Vmax OR Ui ≥ Voc, Vt OR Uo;
Imax OR Ii ≥ Isc, It OR Io;
Pmax OR Pi ≥ Po;
Ca ≥ SUM OF ALL Ci'S + Ccable;
La ≥ SUM OF ALL Li'S + Lcable
1.2. ASSOCIATED APPARATUS MANUFACTURER'S INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT
1.1. NO REVISION TO DRAWING WITHOUT PRIOR CSA APPROVAL
CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125
TOLERANCES:
.X ± .1 [2.5]
.XX ± .02 [0.5]
.XXX ± .010 [0.25]
FRACTIONS ± 1/32 ANGLES ± 2°
DO NOT SCALE PRINT
EMERSON PROCESS MANAGEMENT
ROSEMOUNT®
8200 Market Boulevard Chanhassen, MN 55317 USA
TITLE
INSTALL. DRAWING: 775 (THUM) CSA I.S.
DR. H. CHHUOY 11-4-08
APP'D J. VANDERAA 11-4-08
CAD MAINTAINED (PROE)
SIZE C
DRAWING NO. 00775-0012
REV AB
SHEET 1 OF 1

Reference Manual
00809-0100-4075, Rev CA
March 2014

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